

Assisting dental education and dental public health in developing countries: a symposium



**Appropriate Health Resources and
Technologies Action Group Ltd.**

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**Assisting dental education and dental public
health in developing countries: a symposium**

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Introduction to the revised second edition

Since the symposium, held in 1980, many of the participants have kept in touch. The work of the AHRTAG* Dental Health Unit, also set up in 1980, has developed considerably. The Unit aims to promote oral health education and dental public health at community level in developing countries. Local health workers and trainees are the most important resources and they need practical information on effective and affordable ways of improving oral health and hygiene in the communities. AHRTAG has been developing ways of supplying this information in three ways:

Information and resource service

AHRTAG continues to gather information about oral public health in developing countries to provide a resource centre for dental health workers in developing countries. Requests for information are received from all over the world and where possible people with similar problems and interests are put in touch with each other.

Teaching materials and publications

The *Dental Health newsletter*, published by AHRTAG, gives practical information on primary dental health programmes, and dental public health. It is produced twice a year and distributed free to developing countries.

Slide sets on common oral diseases are being developed and the first set will be available in 1984. A manual on the planning and management of oral health services in developing countries is being prepared and is due to be published at the end of 1984.

Low cost dental equipment

Low cost, well designed dental equipment can be manufactured locally, allowing dental health services to be made more widely available. AHRTAG has developed basic dental equipment including a chair, light and a stool and these are being field tested in conjunction with the Intermediate Technology Development Group (ITDG).

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Low cost dental materials

Work is also in progress with the Intermediate Technology Development Group on developing dental materials which can be made locally.

AHRTAG would welcome ideas and information on training, equipment and materials from health workers in developing countries.

Short course

Attempts have also been made to develop a short diploma course for trainers of oral health workers in developing countries¹. The highly successful WHO/DANIDA course for public dental officers from developing countries has been modified by symposium participants,² stressing the primary health care approach.

Since the 1980 symposium, the oral health problems of developing countries have received far more attention from many international agencies. However much remains to be done.

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2. Further information from: Dr I. J. Møller, Regional Officer, Oral Health Unit, World Health Organization, 8 Scherfigs vej, Copenhagen, Denmark.

ORAL HEALTH ASPECTS OF DEVELOPMENT PROBLEMS

HEALTH, ILLNESS AND DEVELOPMENT

Dr Martin Hobdell (The London Hospital Medical College Dental School)

Two phenomena have characterized the trends we have seen in public health in the last decade. The two that I think are the most important are the emphasis on primary health care and the recognition of the relative failure of modern medicine to reduce the premature loss of life due to such diseases as heart disease and cancer, no matter how much money we spend or sophistication we put into the technology. I see these two phenomena as opposite ends of the health services continuum because the purpose of the primary health care approach is directly, but not exclusively, concerned with the problems of rural and peri-urban populations in developing countries. The problem of mortality statistics in the sphere of diseases I have mentioned is most directly, but not exclusively, concerned with the health services of industrialized urban populations in developed countries. What lies between the two needs, and where oral or dental health fits in with that, is the substance of this meeting.

To demonstrate the relationship between health, illness, and development, it is necessary to emphasize the relationship that we now recognize between the environment and our life style and health. The developed countries of the world have not come about by accident. They are very much the result of trade and commerce. The industrial revolution brought with it a change in population distribution, from dispersed groups living in rural areas to the high concentration of people in urban areas.

In the early part of the nineteenth century in the United Kingdom, concomitant with the start of the industrial revolution, there was a marked rise in ill health, particularly in urban areas. One of the things that contributed markedly to the growing ill health was overcrowding and the epidemics that came with it.

Recently there have been improvements in health, but mostly in developed countries. In 1871 in the United Kingdom the life expectancy at birth was 40 years; by 1901 it had gone up to 51 years; and by 1959 to 68 years. By comparison, if we look at India in 1881 life expectancy at birth was 25 years but had only risen to 35 by 1955. The population profile for developing countries has remained almost static. Typically, around 50 per cent of people are below the age of 15 years and, although there is a high birth rate resulting in 25 per cent being under five years, there is also a high infant mortality rate. In developed countries the picture has changed dramatically since the end of the nineteenth century resulting in a much higher percentage of old people in the population.

One can see clearly the effects of the Industrial Revolution by looking at Africa from about 1562 when the first slave ship left the continent. The slave trade over the next three hundred years caused the de-population of vast areas. The subsequent diminution of the slave trade led to a gradual increase in the development of forced labour in Africa itself; with this the colonial period had begun.

The rubber plantations in the Congo Basin illustrate how brutality decimated the population from 30 to 40 million to something like 8.5 million in the same area over a period of about 60 or 70 years. The tied work force was able to extract raw materials and produce agricultural products to feed the new industrial complexes and the landless workers in Europe.

These processes themselves spread disease. Rinderpest is a disease that attacks wild animals and domestic cattle. This first occurred around 1891 when the Italian army brought infected cattle into Eritrea. The cattle of the pastoral people in the region were wiped out almost completely, and the peasant population had to migrate or were starved out. The consequence of this was that there were no longer cattle grazing on the land, trees took over, and then the tsetse fly followed in their shade. The land could not be returned for use by cattle.

Changing patterns of food production have affected health. Many colonies with a fairly balanced form of agriculture were rapidly changed into monocultures. In Ghana there was a dramatic increase in the production of cocoa and a rapid diminution in the production of palm oil. This change was created by the policy of taxation which created pressure on the peasants to change production. Growing only one type of product has many dangers. Should their one crop be destroyed by disease, people have nothing to fall back on either for cash or for food. They become very vulnerable to weather conditions. In addition, their diet changes and in many cases becomes poorer.

The colonial taxation system brought with it the need for the peasant population to sell their labour either to the plantations or to the mines. Thus began the system of migrant labour.

Migrant labour has brought with it a further change and deterioration in health such as in southern Tanzania. More and more women were left alone to fend for their families and children. The men were paid a single-person wage and could send home very little money. They came home probably once a year, if that. There was a great increase in the number of pregnancies, and the number of children born. However, there was also an increase in the child mortality rate, particularly due to malnutrition and infectious diseases.

A survey in India in 1974 showed that the five most common diseases were:

- Anaemia
- Respiratory disease
- Nutritional deficiency disease
- Trachoma
- Dental caries.

At the same time as visiting people in their homes, a study was made of the most common diseases with which people came to health centres. This showed up one interesting point. There were no dental health facilities, so no one came complaining of dental disease. If you do not have a service then people cannot use it. It is not apparent to the administration and is, therefore, not a disease and not a problem. It was also very clear that neither did the people come complaining of malnutrition although it was very common. Perhaps socially it was not acknowledged as a disease but accepted as a way of life -

and death.

In late nineteenth century Great Britain, gastro-intestinal disease, whooping cough and tuberculosis were all highly prevalent. Changes have only come about as our housing, sanitation and food have improved. They have only improved as we have reaped the benefits of the industrial revolution, itself built on the backs not only of our own industrial workers but equally on the backs of workers in our former colonies and at the expense of their health.

Turning briefly to oral diseases, there are specific oral conditions which can be related to poverty in developing countries. First, ankylosis of the jaw from birth trauma is common and very debilitating. Second, cancrum oris or gangrene of the face is common in under-nourished children. This was also prevalent in the United Kingdom when malnutrition was a problem in the late nineteenth century. Third, oral tuberculosis in children. Again this was prevalent in the United Kingdom at the beginning of this century.

Fourth, Burkitt's lymphoma - a link has been established between frequent attacks of malaria and the effect of the Epstein-Barr virus. This can be related to land policy. For example, in Zimbabwe the white population claimed the land less highly infected with malaria-carrying mosquitoes forcing the indigenous population to live in the less healthy areas.

Finally, the massive carcinomas that have gone untreated simply because of a lack of health services in developing countries. Such cases are a tragic testimony to the under-development which has followed in the wake of our industrial revolution.

In summary, it is reasonable to say that we cannot separate the pattern of disease and problems we see in industrialized countries from the problems of disease and the lack of health in developing countries. We are dealing with a continuum of health services development. We are linked by history and in our struggle to seek and find ways of achieving Health for All by the Year 2000.

PATTERNS OF ORAL DISEASE IN DEVELOPING AND DEVELOPED NATIONS

Dr Aubrey Sheiham (The London Hospital Medical College Dental School)

I would like to give a general over-view of patterns of dental disease in developed and developing countries.

As the standard of living increases, natural morbidity tends to decrease but at a certain point morbidity increases again with further increase in development. Therefore, when the natural morbidity is added to the morbidity which is linked to this further increased development one finds that beyond that point there is a net increase in disease levels.

This also applies to dental diseases. As standards of living rise there is a decrease in periodontal disease but an increase in caries. The rise in dental caries is much greater than the decrease in periodontal disease so a net increase in disease results.

In 1950-52 among post-war children in the United Kingdom, the caries rate or DMF at 15 years of age was about four, but ten years later, with increases in patterns of sucrose consumption, 15-year-olds in the same institution had a much higher DMF of ten.

The typical pattern of dental disease found in young adults in industrial countries is one with a large filled component, a small missing component and a small amount of untreated decay. As the population gets older, the missing component increases, so that when you get to 65 the majority of the teeth are missing in the population with very few of the teeth that have been filled remaining.

Treatment needs reflect disease patterns in industrial societies. The need for fillings is initially very high, decreasing as the population gets older, but with age comes an increased need for removable prostheses, etc.

A study of the dental treatment requirements of university entrants in Finland showed that 18-year-olds needed seven hours of treatment. Yet they had been having treatment all their lives.

Populations in western industrial societies become more edentulous as they get older. One of the reasons for this, particularly after the age of 35, is that dentists in many western countries have ignored periodontal disease.

In an investigation from London, at the age of 15 to 19 years, the overall prevalence of periodontal disease was 99.7 per cent. Fifty-two per cent already had destructive periodontal disease and two per cent were in the terminal stages of that disease. In the age group of 35 to 39 years, 46 per cent were in the terminal stage of periodontal disease, and were about to lose their teeth. In the 55 to 59-year-old group, 95 per cent of those who still had teeth were in the terminal stage of periodontal disease and were about to lose them. The subjects were managers and white-collar workers in a large international corporation in London who were going regularly to their dentists.

If we are going to learn some lessons from industrialized countries we have to see what the implications are of gum disease. Recently I made some estimates from studies of the prevalence of periodontal disease in the American population on the basis of timings which were put out in the WHO Technical Report Series 621 on periodontal disease. The time needed for periodontal treatment would be 353 million hours. Follow-up treatment would require another 112 million hours per year if six-monthly follow-ups were done.

"The inability of all the studies to prevent large mean scores for missing teeth by the age of 35 to 44 is a further warning bell, that preventive practice by the population, the profession and oral health services in general is inadequate. This needs no further analysis to underline its validity." This quote from David Barmes sums up the situation in developed countries. It is based on the conclusions of an international collaborative study which was conducted in Norway, Japan, Australia, New Zealand and Germany.

On the positive side I want to show what you can do by a public health approach. A recent study in Norway showed that, in 1970, among three-year-old children 11.6 per cent had no caries but by 1974, 72 per cent were caries-

free in the same town. This is a remarkable improvement and has been achieved by the following means. First of all they have a food policy in Norway based on health criteria; secondly, parents visiting any form of health facility were given dental health advice, dietary advice, and fluoride tablets or drops for their infants. No new technology. We already have the means available to prevent dental caries.

In Norway there has been a dramatic reduction in treatment needs. This is happening in most Scandinavian countries, also in the United Kingdom, and in New Zealand.

Professor Marthaler in Switzerland has come up with the following conclusions. The percentage of edentulousness, even for 65-year-olds, is going to decrease very dramatically. By the year 2000, less than ten per cent of the 65-year-olds will be edentulous. What are we going to do if people keep their teeth longer, particularly heavily restored? It will be very complicated and expensive; every time a filling is replaced, the life expectancy of that filling decreases. I am sure that the cost of the fifth filling is very much higher than of the first one, probably ten times as much.

Let us now turn to the Third World. What is happening in terms of dental disease? Important increases are occurring in dental caries in some developing countries. In Vietnam, for instance, there is a dramatic increase from 2 to 6.3 DMF teeth at 12 years of age in just over a ten-year period.

This dramatic increase in caries in many developing countries is related to sugar consumption. A study by Professor Takeuchi of dental caries in Japan experienced during and after World War II illustrates the importance of sugar as a causative factor in dental caries. During the war years Japan had practically zero sugar. He showed that until you get beyond 50 grammes of sugar consumption per person per day you do not get a lot of caries. About 100 teeth per thousand are affected. Beyond this point you find that the caries rate really increases greatly.

The major problem in developing countries at present is periodontal disease.

A national study in Nigeria showed that after the age of 14 there is a dramatic increase in the number of people with periodontal pocketing, and by the age of 50 to 59 about 100 per cent of the population is affected. However, I did not find anyone who was edentulous. My contention was (and is) that there were no dentists to pull out the teeth. Since the average life expectancy at that time in Nigeria was 42 years, the teeth did not have time to die before the person died. If there is an increase in life span in the Third World, then periodontal disease will become a major cause of tooth loss in the population as a whole.

The other important aspect of periodontal disease is that the rate of progression of periodontal disease appears to be more rapid in developing countries. Comparisons of Sri Lankan tea plantation workers with Norwegian academics show the two ends of the spectrum, the very poor and the very rich. The average Norwegian, at 40, had lost just over one millimetre of periodontal attachment. At the same age the Sri Lankan tea plantation worker had lost about five millimetres of attachment. Many of the latter had lost teeth because of periodontal disease, whereas most of the academics had not. We see again the consequences of hygiene and general environmental conditions on the patterns of dental disease.

With this rate of progression of periodontal disease in Norway, the people have to live over 150 years before losing enough periodontal attachment to cause tooth loss. Are Norwegians, therefore, being over-treated? The dentist-population ratio in Oslo is one dentist per 600 people and still they find that 30 per cent of 35 to 44-year-olds need periodontal surgery.

It is important to translate the periodontal treatment need of populations in developing countries into time. A study in Maputo province in Mozambique showed that the 6 to 12-year-olds would require 800 or 900 hours of treatment. For instance applied to Indonesia this means that scaling the teeth and giving oral hygiene instruction would take up the whole of the health budget.

In certain developing countries the pattern of dental health is similar to that which we see in developed countries, for example in parts of Mexico and

Malaysia. The end result is a tremendous number of missing teeth.

Cancrum oris is not a trivial condition. In Nigeria, we found that ten per cent of children between the ages of two and six had acute ulcerative gingivitis, a precursor of cancrum oris in under-nourished children. Untreated cancrum oris appeared to be a common condition. The problem is not the prevalence but the fact that the child will require a hospital bed for up to three years for plastic surgery if it is to survive and lead a normal life. The same bed could be used by over 30 children per year suffering from acute infectious illness. Even after full treatment the life expectancy of the child is not very certain. Another problem is oral malignancies. The prevalence is the same but since the population is often much greater and seeking care much later they demand proportionally more of the scarce resources in the developing countries.

In conclusion, I have described a spectrum of oral disease. At one end are the highly developed countries with a lot of dental caries and periodontal disease which, however, appear to be decreasing. It will take 50 to 60 years for this heritage of ill-health to be overcome. Sweden is a very good example. An increasing percentage of the dental health budget is going on crown and bridge work. In the United Kingdom too, such treatment is increasing.

At the other end of the spectrum, in Third World countries, we see a very rapid increase in dental caries, and a lot of periodontal disease which is not improving. In some developing countries like Malaysia the picture is different; they have a lot of tooth loss and a well-developed dental profession. The tooth loss leads to a need for prostheses and so on. We should bear this in mind when we talk about how to alter these patterns, trying not to repeat some of the mistakes made in developed countries.

INTEGRATING PRIMARY ORAL HEALTH CARE WITH OTHER PRIMARY HEALTH ACTIVITIES

Dr D.E. Barmes (The Oral Health Unit, The World Health Organization)

So far we have considered the plight of developing countries in terms of the general background to health and oral disease.

We have plenty of data in our global bank on oral disease levels, trends and manpower used to date. By contrast we have very uneven data on the total cost of oral health services. Thus the strategy of the WHO Oral Health Programme has been to concentrate on relating disease levels to manpower needs within integrated oral health programmes, based on measurable goals.

I am going to expand on that strategy in order to deal with this subject of integrating the programme of oral health care with other health activities. As we go along, you will see why oral health needs to integrate with other health activities and also with other non-health activities.

Recalling the two trends that have been defined globally for dental caries, an increase in developing countries and a decrease in some highly industrialized countries, where a comprehensive fluoride-based preventive programme has been practised, we have been able to define from our WHO global data bank a single-figure indicator with which to measure success or failure of oral health endeavours for the year 2000, as part of the general WHO programme of Health for All by the Year 2000. We are proud we are the first of the programmes of WHO to be able to offer such an indicator.

The indicator is a mean of three decayed, missing, and filled teeth (DMFT) at 12 years of age. Its special strategy as a long-term indicator of a programme's success or failure rests on the fact that:

1. It is the crude average for developing countries, all of which need to halt the increase in trend or even decrease it where the three-DMFT average has already been exceeded.
2. It is the level to which we know we can reduce caries experience by the use of fluorides because this reduction has already been achieved in certain

highly developed countries.

3. Its achievement, using the methods that I will define, allows for the definition of sub-goals in every aspect of oral health, including further goals relating to dental caries; goals for periodontal disease, and other disease control; and management goals. It permits the use of standardized records, stores, supplies and facilities, and finally of course the definition of manpower production goals.

4. Its achievement can be evaluated objectively and simply. It is therefore meaningful for all countries, highly developed or developing, it is practical and achievable.

If we look at the countries of the world divided into groups according to their mean DMFT at 12 years of age in 1980 there are 34 developing countries and only one highly industrialized country with a DMFT at this age of less than three. The one goal of this group is to stop this increasing to three. In the next bracket, with a DMFT of three, there are 27 developing countries and eight highly industrialized countries. Finally, you have 19 developing countries and some 18 highly industrialized countries that have very high levels of dental caries. I hope it comes as quite a shock that there are so many developing countries at that high level of disease, considering that none of them were there 20 years or so ago.

A number of countries are still searching for data.

It is also important to realize that already a mean of three DMF teeth in developing countries represents a considerable increase in the prevalence, which was probably not more than 1.5 DMFT in 1960. It is almost certain that the situation will deteriorate further over the next few years as the well-established trend of dental caries prevalence cannot be turned around overnight.

To some extent that trend will be offset by a shift in the prevalence in highly developed countries, but three salient features point towards an overall net deterioration of dental health in the world:

1. The increase in trend affects 80 per cent of the population and the decrease only 20 per cent.

2. The economies of developing countries cannot handle adequately an increased burden in any health area and certainly not by the traditional procedures.

3. Manpower in developing countries is inadequate and that inadequacy is going to increase.

In the face of these problems, the response has been predictably farcical. The developing countries initially contemplated the curative, restorative and rehabilitative approach which has already failed in highly industrialized countries before the latter more recently turned to prevention. Further, developing countries which have established or are establishing schools for the education of dentists have in the main failed to provide the necessary planned support mechanisms and facilities for their useful functioning after training. That is almost as important as the first. Highly industrialized countries, which have already achieved a very high number of dentists (even to the extent of dentists with a population ratio of 1 to 1000; one country has reached 1 to 922 people) continue to produce manpower at the same rates on the assumption that jobs will be found either within or outside their own countries.

Nearly 50 countries out of the 155 WHO member states have less than one dentist per 100,000 of population. Some 54 of the 58 countries where increases have occurred in the past decade are highly industrialized countries. It is equally as frightening when you see such levels being produced in the developing countries, because that sort of manpower is the wrong type. Something like 35 of the 46 countries with the poorest ratios come from Africa.

The problems inherent in the existing and developing manpower situation can easily be illustrated:

1. Despite the lack of dental manpower, numerous situations exist in devel-

loping countries in which the skills of dentists are not used because of lack of a defined and supervised dental health programme. Dentists employed by Government serve only a tiny percentage of their statutory duty hours. In one country, which has something like 180 dentists for 20 million people, these dentists are not being used in governmental positions. They drift into private practice in which they treat almost exclusively the elite.

2. There is often a large proportion of dentists migrating from developing to highly industrialized countries. That means that developing countries with poor economies are training manpower for highly developed countries with rich economies.

3. Although a few individuals will not only leave highly industrialized countries to work in developing countries, but actually make determined efforts to do so, the great majority will accept employment outside their profession rather than take such a step. For example in Canada, it is extremely difficult to re-locate a large number of dentists just from one part of the country to another. In the English-speaking provinces, the relatively low dentist-population ratios and preventive programmes have successfully reduced dental caries and periodontal disease prevalence. So an important surplus of dentists already exists without any appreciable reaction towards lower intakes into the dental schools. In the French-speaking provinces, oral diseases are much more prevalent and the availability of dentists much less than in anglophone provinces. So far, the chosen solution is not to attract dentists from anglophone to francophone provinces but to increase the intakes in the schools for francophone students. If this is the response within one country, how can you expect to be successful in re-locating half of Sweden's, half of Norway's, and half of Denmark's dentists, in Chad and Zaire, and so on? Admittedly there has been some movement of dentists from countries with more available manpower to others less well served. However, this has only shuffled deficiencies from country to country. I speak particularly now of countries like Egypt and Pakistan, which have contributed a number of dentists to parts of the Middle East and North Africa.

WHO's approach is simple and effective provided countries can generate the

discipline and organization to follow the plan. The basis is a five-point programme. First, a preventive programme including health education. Second, some targeting of services - particularly to school dental services. Third, demand services for all the non-target sectors. Fourth, manpower production in amount and kind - and we must remember not only amount but also kind. Finally, monitoring and evaluation.

Each of the five parts of the plan should have measurable goals over a ten year period. Achievement in each part of these goals affects the plan and requirements for all the other parts. It means that if a preventive goal is to reduce the average DMFT in school children by a specified number, the amount of dental services and manpower are reduced. Similarly if a goal is to increase demand services by a specified percentage, extra services and manpower are planned on the assumption the increase will be achieved. As far as we know this procedure exists nowhere as a national system. Instead, we find manpower planning in isolation, preventive planning in isolation and either services planning in isolation or a market-controlled supply and demand situation. The Chief Dental Officers from Norway and Denmark have presented their programmes in a masterly fashion and almost made it seem that they are the closest to achieving this sort of combination.

This five point plan, based on situation analyses, which includes the essential ingredients of demography, health manpower and health facilities, both actual and projected, as well as data provided by bona fide surveys, is detailed in the WHO Manual on the Planning and Evaluation of Manpower Services. It provides calculations of manpower needs for several example countries at different levels of development and of oral disease experience.

The reality of trying to achieve the objective of no more than three DMFT at 12 years of age, using the five point plan brings us face to face at last with the title of this paper. Over the past century in highly industrialized countries the dental profession understandably organized a largely isolated system of education and practice. That system has had a few successes, but the need for changes is seen now even in the countries for which the approach was developed. With our present understanding of the causes of the economic plight of developing countries it is critical that a co-ordinated and

integrated approach is used, rather than a repeat of the ad hoc evolutionary one which has occurred over the last century in developed countries.

There are ten features of such an integrated approach:

1. The establishment of the WHO co-ordinated planning mechanism for oral health to ensure that both the service and manpower production activities are integrated, to provide what is necessary to achieve the stated goals and to react in time to changes.
2. An efficient monitoring system, used preferably every five years, to enable successful planning and re-planning to continue. We have worked very hard in WHO to define good working estimates whereby simple, inexpensive, monitoring programmes can be carried out, even in the poorest of countries.
3. Control of programmes.
4. Establishment of clearly defined collaboration with the education authorities, not only for the development of school services, but also for the participation of school teachers in running them. You will see how this entire strategy depends on education authorities being prepared for the teachers to actually participate.
5. The use of school teachers to conduct the preventive programmes in schools as well as part at least of the health education programme.
6. The use of primary health workers and medical health auxiliaries to conduct dental health programmes and first-aid instruction in villages, health centres and hospitals.
7. The use of dental auxiliaries only in supervisory and training roles for health education and first-aid programmes: in other words, not to do, but to supervise and train. Concentrating their doing more on specialized programmes such as systematic dental care where this is part of the national plan.
8. The provision of appropriate training programmes for school teachers,

primary health workers and health auxiliaries, in addition to the training of dental auxiliaries and dentists, for the specific roles required of them in a given population. All of you will recognize that there is a tremendous amount in that one single point. For example how many of us are training dentists, not only for specific roles in our own countries, but to work in other countries? This applies both to dentists and auxiliaries.

9. The use of dentists for the highly skilled services required to define and organize a National Dental Health Plan; in training programmes; in providing public and private services beyond the scope of other manpower categories. The dentists should be the specialists and used as specialists and not in doing all the routine day-by-day work.

10. Finally, the provision of a small, efficient, central staff to ensure all aspects of oral health service and training are well co-ordinated and organized; including the provision of appropriate personnel support, the siting of services and the provision of equipment, monitoring and supervisory control, efficient reporting and evaluation. This basic control and management is the most important single factor which is missing in the development of the dental health services in many countries.

The situation in which the oral health sector finds itself today is a challenge. There are already signs that we may perpetuate the mistakes of the past in oral health while failing to take full advantage of the successes. We have the preventive and organizational tools with which to save developing countries from trying to scale the costly heights of oral health prevalence before turning to prevention. These can be avoided by careful planning, organization and evaluation. Co-ordination and integration of appropriate manpower programmes are essential to success. The prize is avoidance of unnecessary massive costs for oral health for populations which are already deprived in so many other ways.

IDENTIFYING APPROPRIATE TECHNOLOGIES - CASE STUDIES FROM DEVELOPING COUNTRIES

CASE STUDY No. 1 - ETHIOPIA

Dr Berit Olsson (University of Lund)

I will describe the pattern of dental disease in Ethiopia, then mention some preventive methods and finally discuss a possible dental health programme.

Ethiopia is a highland area bordered by deserts towards the Red Sea, Somalia and Kenya, and divided by the Great Rift Valley.

Less than ten per cent of its 30 million inhabitants live in urban centres. The vast majority live as smallholding farmers and pastoralists in scattered homesteads. Ethiopia is one of the poorest countries in the world. Among the characteristics of under-development are numerous health problems and a physician-population ratio of one doctor per 80,000 inhabitants.

Dental health has constituted a minor problem receiving marginal attention in public health planning, but the pattern of dental diseases is changing. Dental fluorosis is common in the volcanic Rift Valley area where high levels of fluoride are present in the water. The most severe fluorosis was observed in areas where modern technology has provided very deep wells containing water with fluoride levels up to 17 parts per million.

Gingivitis is common in all age groups. In a study in 1974 it was found to affect 60 per cent of the six to seven-year-old children and 85 to 100 per cent of the older groups. However, destructive periodontal disease with pocket formation was uncommon in the younger ages, but is common after 45 years of age. Acute ulcerative gingivitis was not seen. Neither was cancrum oris. These observations were similar to those observed in 1958 when dental health in Ethiopia was studied as part of a nutritional survey.

The level of dental caries was very low in 1958. Of persons under 40 years of age 82 per cent were caries-free at that time. This was attributed to the traditional Ethiopian diet which contained no refined sugar products,

although rich in carbohydrates. In 1974 only 50 per cent remained caries-free.

This increase in dental caries is even more obvious when the number of decayed, missing and filled teeth are compared in the two studies. The obvious reason for this rapid increase in dental caries was the establishment in the 1950s of an Ethiopian sugar industry which in the 1960s produced more than the small urban population demanded.

A huge marketing campaign was launched all over the country by the sugar industry. The rural population was given free sugar and taught to sweeten their tea and coffee and children were given free samples of candy.

More than 80 per cent of those interviewed in 1974 reported regular consumption of sugar, a product that previously was practically unknown in rural Ethiopia. The success of the campaign was partly due to the slogan "sugar makes you strong as an elephant" emphasizing sugar as a vitalizing tonic which had a deep impact on the population weakened by parasites, infectious diseases and nutritional deficiencies. A future increase in cash income will probably lead to an even greater increase in the consumption of sugar and extend the use of sugar products like soft drinks and biscuits further into the rural population.

The consequences on dental health of such a dietary change may be illustrated by the dental status of privileged private school children in a school in Addis Ababa who already eat a westernized diet, rich in sugar and confectionery.

In these children caries was very frequent. The figures on dental caries in the 13 to 14-year-olds show that only ten per cent had one or more decayed teeth in 1958. The average DMFT was 0.18. In the urban population in 1974, 50 per cent had caries, the average DMFT was 1.54, and in Addis Ababa privileged children, 75 per cent had caries and the average DMFT was 3.34.

The primary teeth were also severely decayed - 4.44 teeth were decayed or filled in the primary teeth of six to seven-year-old privileged children as

compared to 1.14 in the rural children.

Disfiguring fluorosis is frequent in some areas. The prevention of fluorosis will be possible through the re-localization of wells with less than two parts per million of fluoride in the water. Such wells can sometimes be sited close to the high-fluoride ones and their use should be advocated for drinking water.

The level of periodontal disease was low (as was the level of dental caries), although a considerable increase had occurred in the last few years and a further increase may be anticipated. In the prevention of such dental deterioration information on the harmful effect of sugar will be necessary, but probably the most feasible approach is to strive for an improvement in the level of oral hygiene.

In rural Ethiopia the habit of using a wooden chewing-stick for oral cleaning is widespread, although the habit is often abandoned when a modern lifestyle is adopted. The stick - called the mefaka - is cut into a point at one end and chewed into a tuft which is used as a brush. The efficiency of such a mefaka used in a vertical one-way technique has been studied in an oral hygiene programme in a school.

Some children were instructed and trained to use a regular toothbrush.

Others were instructed and trained in the use of the mefaka. Both groups were advised to clean twice a day.

Two groups in addition performed daily oral cleaning under direction and supervision, in one class with a toothbrush and in the other with the mefaka.

All the children, including one control group, received professional oral cleaning after an initial examination, and were then re-examined after a trial period of three months. The results indicated that there was little improvement in the two groups that received information only, whereas those who had participated in the supervised programme showed an improvement. Furthermore the mefaka was as efficient as the toothbrush in removing oral

deposits. It was concluded that the mefaka should be recommended for use in preventive dental programmes in Ethiopia, since it is effective, inexpensive and familiar to the population.

The challenge which faces developing countries like Ethiopia - and indeed our profession - is to identify a system for the implementation of a nation-wide preventive programme to halt the anticipated dental health deterioration.

The following stages can be identified in this process. The first stage, which I believe is the crucial one, is the realization that dental health is a national resource worth taking care of. This is where the role of our international organizations is important in convincing the health authorities of the costly consequences of dental health deterioration and in demonstrating the profitability of preventive programmes and in supporting research to provide base lines. In Ethiopia, base-line data exist and the problem of dental health is realized. However, so far no concrete dental health plans have been made.

The next stage is the planning of a dental health programme. It should emphasize prevention and emergency care. Here again, foreign expertise and experience is valuable. However, the programme must be designed by the country and fit into the comprehensive plan of developmental efforts.

Mistakes are often made. In Ethiopia today, for example, there are ten mobile dental units in the docks which no one knows what to do with because there is no manpower to use them and no plans for their use. Dental health plans of developing countries must fit in with overall development plans.

Then comes the question of training personnel. In a country like Ethiopia, where only 15 dentists are present for 30 million people and only a few dental students are in training abroad it is absolutely necessary, especially in the short term, to rely on another category of personnel to obtain some degree of coverage. The key person may be someone trained in basic dentistry and in dental public health analogous to the medical health officers who are in charge of the rural medical services in Ethiopia. The training should preferably be in the country. Foreign assistants or Ethiopians trained abroad

will be needed in curriculum design, in teaching and in providing educational material.

The dental health officer should be stationed at the regional health centre working with the medical health officer in the training of community health workers. His or her role should be to initiate and guide dental preventive programmes and emergency care.

In this work he or she should involve teachers in the schools, health personnel in the clinics, community health workers for the communities and other agents of change, so that the effect will be multiplied.

Thus a system of primary dental health care based on mass participation, coupled with high-level research, planning, and continued evaluation appears to be appropriate technology for the immediate dental services in Ethiopia, rather than an inadequate replica of the dentistry of the industrialized countries.

CASE STUDY No. 2 - LESSONS LEARNT IN SIERRA LEONE

Dr S.J. Thorpe (Connaught Hospital, Freetown)

Sierra Leone is a small country on the west coast of Africa. It has an area of 27,925 sq. miles and measures 200 miles from north to south and 180 miles from east to west. The population of the country is about 3.5 million with the capital city Freetown having just over 300,000 inhabitants. For the purposes of administration, the country has four main divisions: the Western Area, which includes Freetown, the Northern Province with five districts, the Southern Province with four districts and the Eastern Province with three districts. Rural farming is practised by about 75 per cent of the population, other major occupations being mining and forestry. Transportation is mainly by road, the railway having been closed. Buses travel to the main provincial towns every day and also link Sierra Leone with the two neighbouring countries. There are also internal air flights to the main provincial towns.

The traditional pattern of oral disease in most African countries is one of low prevalence of dental caries whilst periodontal diseases are widespread. However, recent investigations in a number of countries in Africa, including Sierra Leone, demonstrate the most alarming trend, that caries prevalence is increasing rapidly in urbanized parts of the countries in the wake of socio-economic advancement. The higher socio-economic groups eat more refined foods than the poorer groups. In a study which I conducted in Freetown about 18 months ago, 284 out of 295 children seen had dental caries. Freetown of course, with all the living standards of city life and high socio-economic groups, is typical of this trend of increased incidence of dental caries particularly among the younger generations. This has important dental public health implications. It suggests that with the rapid advancement in industrialization and economic growth, prevalence of dental caries in Sierra Leone will definitely follow rapidly.

The prevalence and severity of periodontal diseases is high in Sierra Leone, particularly among the underprivileged classes and in rural communities. The disease ranges from simple generalized gingivitis in the young and adolescent, to chronic destructive periodontal disease giving rise, in a lot of cases, to periodontal abscesses that necessitate the extraction of the teeth.

Acute ulcerative gingivitis sometimes spreads to involve the hard and soft tissues. It is not unusual to find mouths with teeth completely enveloped in heavy calculus deposits. Unlike caries, periodontal disease is less prevalent among the high socio-economic groups of the urban areas because of higher standards of oral hygiene.

Only a few cases of handicapping dento-facial anomalies have been seen in Sierra Leone. This, however, should not be taken to mean that the incidence of mal-occlusion is negligible in the country, because it has been observed that parents generally attach very little importance to mal-occlusion in their children. As a result only a small number of cases seek advice or treatment.

Sierra Leone at present has 16 dental surgeons all of whom were trained outside Africa. Thirteen of these dental surgeons are in government service and the other three are in full-time private practice in Freetown. The government dental surgeons include two specialist oral surgeons and three dental public health specialists, one of whom is also a paedodontist; the others are all general practitioners. Auxiliary staff consists of 15 dental technicians, 12 New Zealand-trained school dental nurses, two United Kingdom-trained dental surgery assistants and 27 dental receptionists who are trained on the job by the dental surgeons.

Dental administration is an integral part of the national health service. The dental departments are attached to the main government hospitals in Freetown and the provincial headquarters towns. The department in Freetown is the headquarters, and the largest, with seven dental surgeons sharing five dental surgeries; it is also the only one of the departments with specialist facilities. The Northern Province has two dental surgeons, one dental technician and one dental receptionist, whilst the Eastern and Southern Provinces each have one dental surgeon, one dental technician and one dental receptionist. All other auxiliary staff work in Freetown. Recently a school dental service was established. The service now has two clinics in Freetown, each with three surgeries, x-ray units and a clinic bus. The service also has one mobile dental unit. The main objective of the school dental service is to educate children and their parents, individually and in groups, on methods of

prevention of dental disease, and at the same time to give routine treatment to conserve both the deciduous and permanent dentition. At present the emphasis is on children in the first three classes of primary schools, i.e. the five to seven year age group. Each school is taken in turn and the children are taken to the clinic by the clinic bus for examination and treatment and then returned to their schools. In addition, the clinic runs an emergency out-patient service where mainly relief of pain is carried out. Each school dental nurse is also assigned to a group of schools where she gives dental health education talks to each school and also addresses its Parent Teacher Association. Three times a week dental health education talks in our local languages are also delivered at the Under Fives Welfare Clinic by the school dental nurses. In order to keep the public informed of the services that are offered, the school dental service participates in the health education exhibitions and in discussion programmes in our local languages on radio and television. One of the dental hygienists, assisted by a dental receptionist, tours the rural areas and some parts of the provinces with the mobile dental unit, giving dental health education talks to the schools.

In the future when funds become available, the school dental service will be extended to the provinces where school clinics will be erected in the provincial headquarters towns. The Australian Government has taken over the training of the school dental nurses which was formerly done by the New Zealand Government. There are also plans to start an intra-departmental training programme for dental receptionists.

Analysis of the Freetown water supply reveals that there is less than 0.1ppm of fluoride in the water. Fluoridation of the drinking water is under consideration and it is hoped that WHO will offer some assistance with the project after the fluoride content of the diet and water in different parts of the country has been determined.

The dental health requirements of Sierra Leone are enormous. In the face of high morbidity and mortality in the medical sectors of health, dentistry is still given low priority. Consequently, the dental health fund finds itself in the pathetic situation of receiving only a meagre proportion of the small

percentage of the national budget allocated to health services. With rural-urban migration resulting in changes in dietary and feeding habits of the population of Sierra Leone, dental caries will become prevalent and severe. Against a background of totally insufficient resources in dental manpower and other facilities, the problem appears insoluble. The dentist-population ratios for the country are as follows:

1. Northern Province - 1:645,835
2. Southern Province - 1:775,002
3. Eastern Province - 1:1,033,336
4. Western Area - 1:40,000

The average for the country is therefore 1:220,000.

The general remedy for this development seems to be the institution of oral disease preventive measures such as fluoridation of water supplies, dental health and nutrition education, oral hygiene in home care, topical application of fluorides and regular dental care. It is, therefore, imperative to extend the concept of the health team to the field of oral health. The dental surgeon should be trained to provide leadership in planning, developing and implementing programmes of prevention, control and treatment of oral diseases. He or she must be able to utilize auxiliary dental personnel effectively and to provide supervision of all dental auxiliaries as leader of the dental health team. The auxiliary trained to combine both the duties of a dental hygienist and those of a dental nurse will be more economical and more effective when used in a preventive dental health programme.

There is an urgent need to start planning programmes for the training of more dental surgeons and operating dental auxiliaries. There is no dental school in Sierra Leone and the size of the country is such that it would be an economic absurdity to recommend establishment of one. One way of overcoming this and related problems could be to establish regional training centres which should be attached to existing dental schools in the African region as an aspect of technical co-operation amongst developing countries.

The utilization of dental surgeons and dental auxiliaries, especially the operating dental auxiliary, requires dental clinical and capital equipment, instruments and dental materials and supplies. Dependable dental equipment is

very important. We have had bitter experience of frequent breakdowns of sophisticated modern equipment. It also results in a drain on the economy. The maintenance and repair of equipment requires the training of appropriate personnel. We need simple, robust, easy-to-service and inexpensive equipment for use in rural surroundings.

Some assistance both locally and internationally will be needed to improve dental health in Sierra Leone. So far, the school dental service has been lucky to get assistance from local and international sources. The two clinics, the clinic bus and radiographic units were donated to the Sierra Leone Government by two local sponsors, whilst the New Zealand Government not only helped with training Sierra Leonean women as school dental nurses, but also sent dental equipment and materials for ten dental school surgeries. The Australian Government has also offered to train a limited number of Sierra Leonean dental therapists in Australia, for the school dental service. Other donations for the general dental services have come from the European Economic Community (EEC) and the South Korean Government which gave six dental units and a mobile dental unit respectively. The United Methodist Church in Sierra Leone has also provided transportable dental equipment and some dental materials which the dental nurses use to offer dental services to the children attending the UMC schools, in Freetown once a week and in the provinces once a month. Two of my colleagues and I have been fortunate to gain WHO and British Council awards to study dental public health; in addition I also had a WHO fellowship to do the MSc course in children's dentistry.

However, a lot more needs to be done. International agencies like WHO can help with fluoridation projects and where these present technological and other difficulties, other topical methods like fluoride rinses in schools can be used. Wealthy and industrialized countries can help with the establishment of regional centres for training of professional and other auxiliary personnel. Simple but efficient dental equipment is needed. Roads are quite bad. Vehicles do break down frequently. Inadequate transportation may also lead to shortage of supplies. The dental surgeons in the provinces often have to cancel treks to the rural areas because of the non-availability of

transport. Sierra Leone at present could do with at least four long-wheelbase landrovers for its dental programmes. We are compelled to look to international agencies for help in this regard.

The greatest problem is often the provision of buildings, which has hitherto been considered the aspect through which the country seeking aid can make its own contribution to the programme. This, paradoxically, has often been one major constraint to programmes: putting up a building or making an extension to an existing building always requires a substantial amount of money, comparatively speaking. It becomes an issue which has to compete with other priorities in the health sector, which is itself in competition with other aspects of the national development programmes.

As a result many arrangements with foreign and international agencies often end up with the other parties living up to their own part of the arrangement whilst the home country cannot fulfil its own commitments. In Sierra Leone for example, we have the experience with dental surgeons. In Freetown where there are ten dental surgeons for a population of 300,000, only the three dental surgeons in private practice have the opportunity of working six full days a week; the government dental surgeons can work on an average only three full days a week because of a lack of facilities. It would be of great help if agencies offering assistance could at the initial stages give an idea of the extent of their aid. This would help us in the general planning of our programmes and in ensuring continuity, either by re-negotiating with the original donors or by exploring other avenues. Evidence of regular foreign participation in programmes can be an effective way of bringing pressure to bear on home governments to fulfil their own obligations.

The planning of health services and other social services can only be successful if the planning authority is aware of the needs and requirements of the community and correctly assesses the order of priorities. Research in dental public health practice is necessary in several areas. However, the few qualified people available are normally engaged in the area of clinical dentistry and the important area of research is ignored. Among the major areas of research that need emphasis are: descriptive epidemiology; the prevention and control of oral disease; manpower development and utilization;

the organization and provision of preventive and treatment services with emphasis on the economics of health care; and traditional therapy in oral health care. Simple methods which are suitable for use by all dentists for health care. The study of oral health states should therefore be reviewed and developed; data will thus become available for planning and execution of integrated medical and oral health programmes. Ultimate research goals can be attained more quickly and more economically through co-operative research efforts between nations. The active participation of international agencies such as WHO is needed. For example WHO could advise developing countries on the selection of projects they could best undertake; it could support research projects in crucial areas which lack the necessary resources; it could itself conduct selected research projects for which its own facilities and resources are particularly suited.

Finally, another important point is the need to have more contact among dental surgeons particularly at regional level. A lot can be achieved by regular contact and exchange of ideas with professional colleagues. Participation at international conferences by dental surgeons from developing countries should also be further encouraged. However, because of the usual financial constraint, we are forced once again to turn to international agencies like WHO, FDI and the Commonwealth Foundation for more help.

One of the main objectives of this symposium is to focus attention on some of the difficulties inherent in assisting dental education and dental public health in developing countries. The dental public health problems which developing countries face are essentially similar in nature to those of the more developed countries, but, because of totally insufficient resources to deal with them the unmet needs are enormous. The planners of dental services in developing countries need to adopt a preventive approach. What developing countries therefore need today is a fairly large number of dedicated community orientated health personnel, to tackle fairly basic health problems, including dental problems. A country that does not succeed in maintaining caries prevalence or in bringing it down to a very low level, will stand very little or no chance of ever offering its citizens a status of oral health, consonant with a productive life by the year 2000.

CASE STUDY No. 3 - RECENT ADVANCES IN PRIMARY DENTAL HEALTH CARE IN THE PEOPLE'S REPUBLIC OF MOZAMBIQUE

Dr F.S. Bernal (Ministry of Health, Mozambique) with Dr M.H. Hobdell (The London Hospital Medical College Dental School, formerly Ministry of Health, Mozambique).

The People's Republic of Mozambique was under colonial rule for nearly 500 years and has just celebrated five years of independence. It covers 750,000 square kilometres and has a population of about 12 million people.

During the long period of Portuguese colonial domination, the Mozambican people had hardly any health care and even less dental care. Before independence there were approximately 16 dentists, who attended only to the needs of the white middle-class colonialists working almost entirely in private practice.

The only treatment available to the mass of the people was an extraction service provided by various nurses and on many occasions by the cleaners and porters and then frequently without anaesthesia. Since independence all the colonial dentists have left the country because of the law that nationalized medicine.

The problem of dental health in Mozambique is more or less the same as that in other developing countries. It is a public health problem.

Up until the present time complete figures on the size of the dental health problem do not exist. However, a limited study has been made of a sample of school children aged six and 12 years. This shows that the problem is considerable (in the light of the available resources) with dental caries, at least on the increase. Ninety-six per cent of the children have chronic gingivitis and 40 per cent have experienced dental caries in one or more teeth. Almost all the carious cavities are without restorations.

In a study of the fluoride content of the drinking water in 14 of the principal Mozambican cities and towns only one showed a level optimum for

the prevention of dental caries. The remaining samples contained virtually none.

As far as it is possible to make comparisons between statistics gathered before and after independence in 1975, the internal consumption of sugar has almost doubled.

There has been a replacement of the Portuguese colonial dentists who left, by dentists of various other nationalities in approximately the same number as before the nationalization of medical services. They are not there to meet the needs of the extremely small bourgeoisie but to serve the mass of the Mozambican population.

Despite improved organization within the health services, all the oral health workers are more or less fully occupied with dental emergencies. Even here there are many deficiencies - because there are relatively few oral health workers; the appropriate infra-structures do not exist within the health posts and hospitals; there is a lack of equipment, hand instruments, medicaments and dental materials. There is also a problem with the importation and distribution of these goods, for such services are poorly developed and the country faces foreign exchange difficulties.

For these reasons, without an immediate policy in relation to preventive, curative and restorative dentistry correctly developed for oral health, oral disease will increase within the population and in the future will be very difficult to control and eradicate.

The government of Mozambique has stated that health is a right of the people. The foundation of this belief is political. The Ministry of Health has defined various steps and stages to be followed in respect of oral health:

1. To develop and maintain an appropriate service network to meet all dental emergencies (essentially to relieve pain and meet life threatening situations).
2. To create methods of prevention within the whole country; in particular to

develop dental health education on a mass scale. Advising people of available dental treatment; the symptoms of common dental diseases; how they are caused; how to prevent them by oral cleaning and the control of sugar consumption.

3. To continue the epidemiological studies of oral disease in respect of dental caries; chronic periodontal disease and the fluoride content of the water supplies in order to plan the correct distribution and development of human and material resources.

4. To put into practice piped-water fluoridation where conditions allow. Where this is impossible in the rural areas, to develop fluoride mouth rinsing programmes in the primary schools.

5. To develop gradually, as resources become available, restorative dental services (both conservative and simple prosthetic ones).

As a result of the foregoing analysis of the problems and priorities in oral health, it has been possible to define what should be the services provided at each level of the Mozambican health service.

Level one: The health centre

Preventive services

To control the oral health of the school children in the area by:

- Providing dental health education (linked to general health education).
- Gathering oral health statistics; organizing regular fluoride mouth rinsing in the primary schools.
- Providing dental health education in the waiting areas of the health centres and centres of production.

Emergency services

These are mainly for the problems caused by dental caries, periodontal disease and accidents. The treatments provided are:

- Dental extractions.

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- The treatment of: acute alveolitis (dry socket); pericoronitis; herpetic stomatitis; acute ulcerative gingivitis; emergency treatment for jaw fractures and dislocations prior to referral to a higher level in the oral health service.

Elective services

- Simple amalgam and tooth coloured restorations.
- Conservative treatment of chronic periodontal disease.
- Simple acrylic dentures.

Level two: The district hospital

Preventive services

- The co-ordination of the preventive oral health programme at district level in primary schools.
- The preparation in the district pharmacy of the sodium fluoride solution for the school fluoride mouth rinsing programme.
- The organization and maintenance of the oral health education programme for mothers attending the ante- and post-natal clinic.

Emergency services

- The treatment of simple jaw fractures using, wherever possible, local anaesthesia for ambulatory patients.
- The post-reduction monitoring and management of jaw fracture patients.
- The taking of biopsies from patients suspected of having oral neoplasias.

Elective services

- The extraction of retained roots and impacted teeth.
- The removal of gingival epulides.
- Intra- and extra-oral radiography.
- Endodontic therapy.
- The treatment of patients referred, because of complications, from health centres.

Level three: The provincial hospital

Preventive services

- The co-ordination at the provincial level of the preventive programme in the primary schools.
- The organization and maintenance of the oral health education programme for mothers attending the ante- and post-natal clinic.

Emergency services

- The treatment of complicated jaw fractures not including those of the maxilla involving the cranial base.
- The treatment of the acute phase of cancrum oris and osteomyelitis of the jaws.

Elective services

- The treatment of dental cysts.
- The treatment of jaw tumours that do not need skin or bone grafts or the use of radiotherapy.
- The treatment of patients referred because of complications from levels one and two.

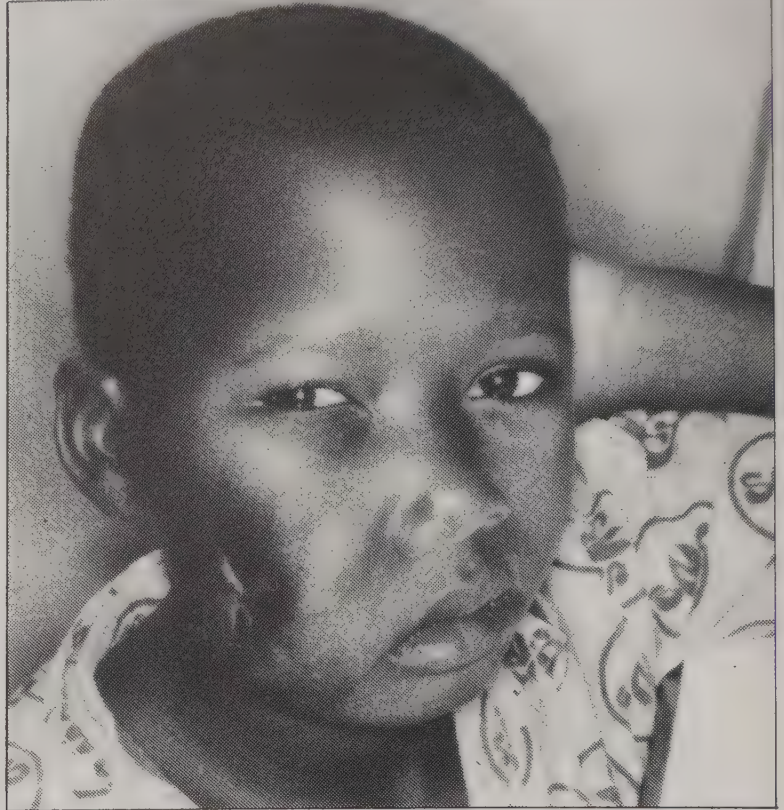
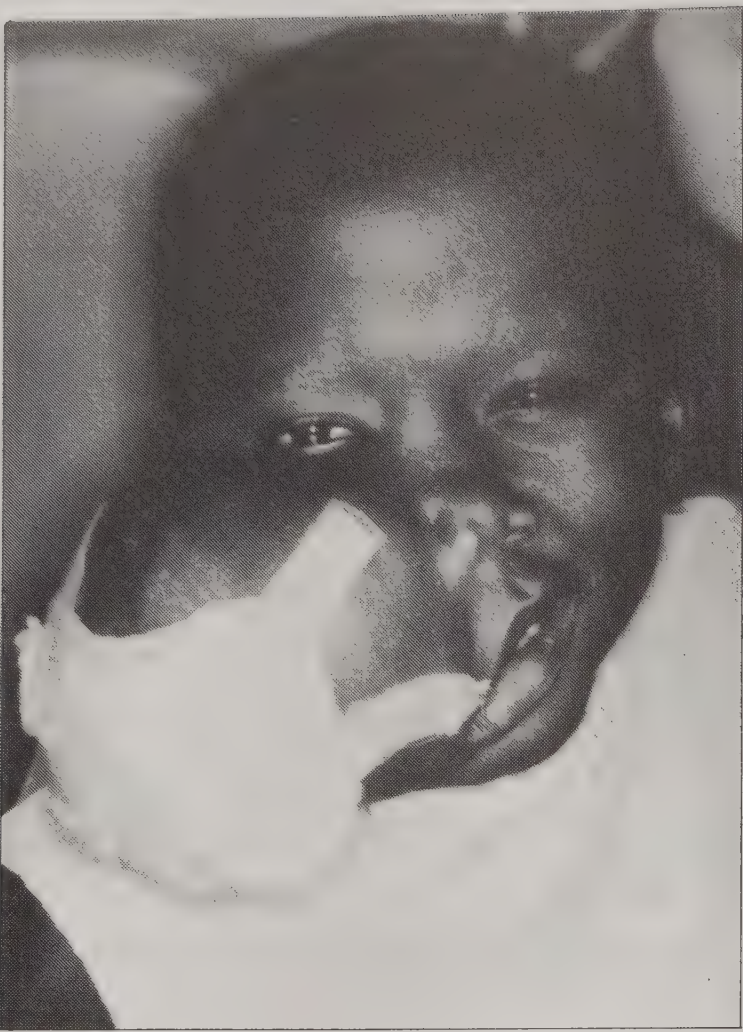
Level four: The central hospital

Preventive services

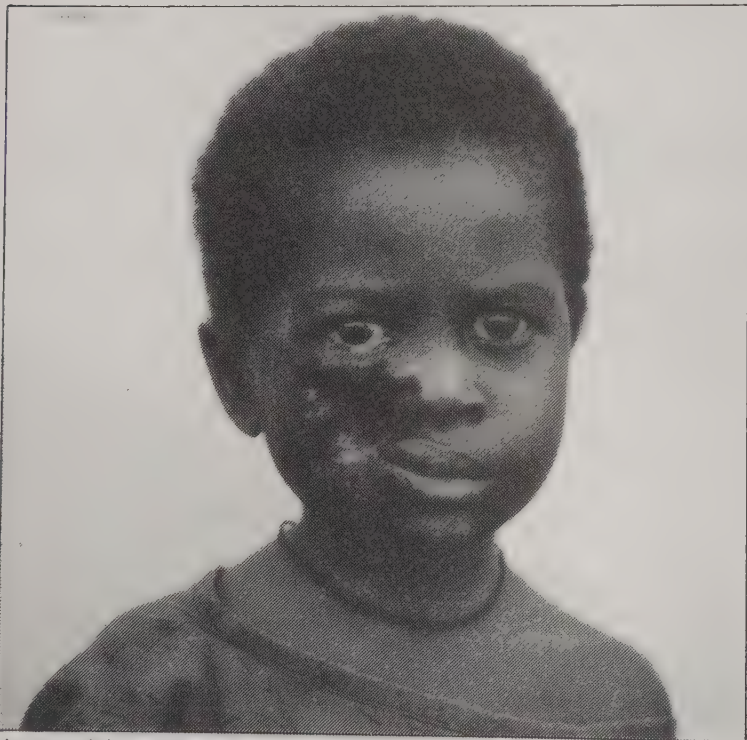
- To control the state of the oral health of the population through the use of epidemiological surveys and the organization and maintenance of a tumour register.
- The organization and maintenance of the oral health education programme for mothers attending the ante- and post-natal clinics.

Emergency services

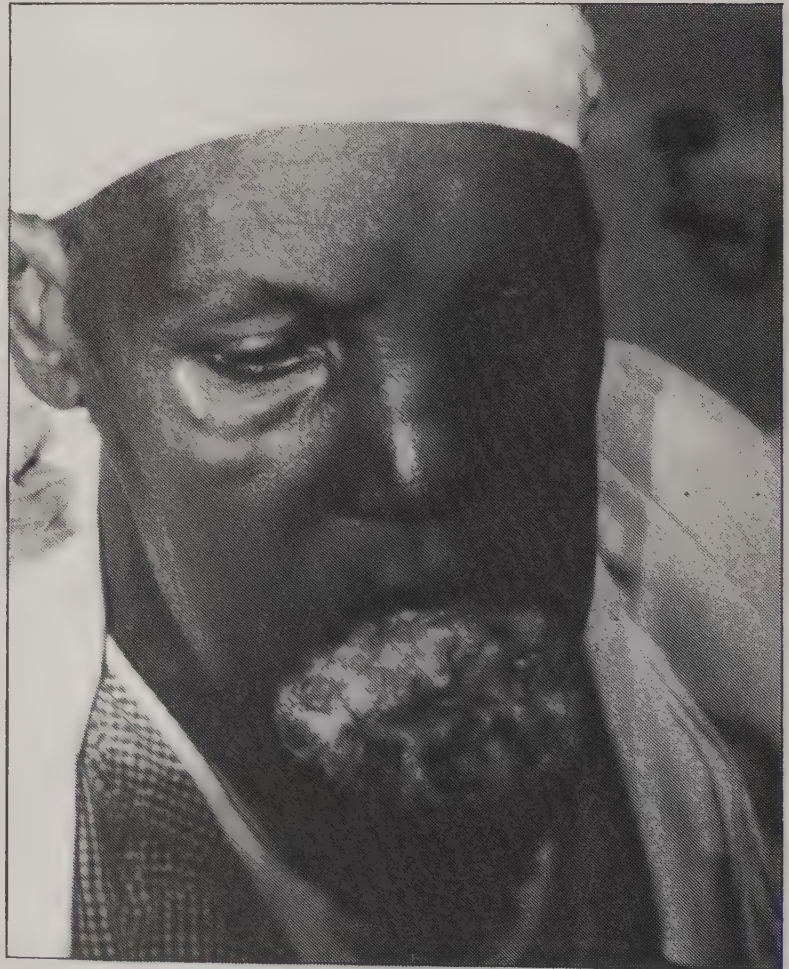
- The treatment of complicated jaw fractures that include the base of the cranium.



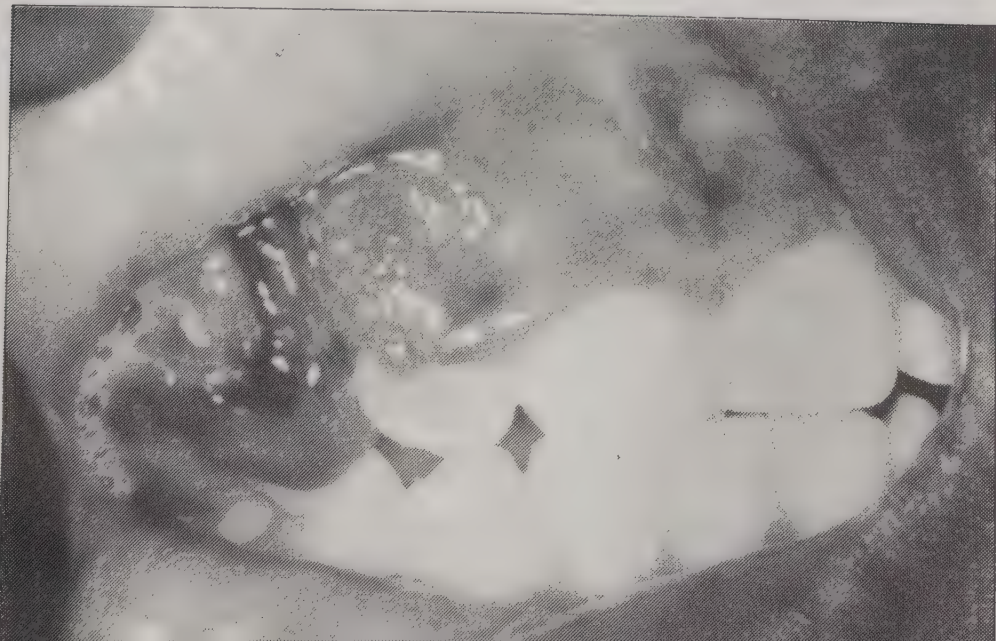
A young girl with Burkitt's lymphoma of the right maxilla that responded well to one course of treatment with cyclophosphamide. She was still healthy 18 months later (left and above).



A combination of poor nutrition and bad oral hygiene can cause acute oral infections that can quickly develop into gangrene of the face (cancrum oris or noma). The photograph above was taken after treatment.



Tobacco and betel nut chewing can result in massive oral cancers (above).



A tuberculous ulcer of the tongue.



Clinic with home-made dental chair (above).



Student dental health auxiliaries building a work bench at the beginning of their course in the People's Republic of Mozambique (above).



Dental health exhibition in Papua New Guinea (left).



The commonest and most appropriate means of tooth cleaning in many countries is the chewing stick (below).

Elective services

- The treatment of oral tumours for which skin or bone grafts or radiotherapy is needed.

Oral health personnel : levels, functions and responsibilities

Clearly, in order for the services described above to function properly and to respond to the situation described earlier both in a correct quantitative and qualitative way, different types of oral health workers are needed at different levels. The tasks for each type of worker and the equipment and materials necessary at each level have been defined.

This permits the rapid resolution of the most urgent problems (emergency care and prevention) through the training of basic oral health workers (Agentes and Auxiliares de Odont-estomatologia) and thus saves the use of the more highly qualified personnel for the more complex tasks.

The career structure of dental health workers in Mozambique

Clinical workers

Technical/laboratory workers

Grade one	Dental Surgeon	
Grade two	Tecnico	Tecnico of the dental laboratory
Grade three	Agente	Agente of the dental laboratory
Grade four	Auxiliar	Auxiliar of the dental laboratory

Principal tasks of clinical dental workers

Dental surgeon

- Co-ordination of dental public health programmes.
- Oral surgery.
- Oral pathology.

Tecnico

- Dental restorations in amalgam and composite.
- Extraction of buried roots.
- Co-ordination of the preventive dental programme at district level.
- Extraction of impacted teeth.

Agente

- Organization and maintenance of the preventive dental programmes in the primary schools and factories.
- Simple tooth extraction.
- Scaling and oral prophylaxis.
- Oral hygiene instruction to groups and individuals.
- Temporary dressing of carious teeth.
- Treatment of common oral infections.
- First-aid treatment of jaw dislocations and fractures.

Auxiliar

- Organization of out-patient dental departments.
- Chairside assisting.
- Treatment of pericoronitis and 'dry sockets'.
- Organization and giving of instruction in the prevention of dental caries and chronic periodontal disease to groups and individuals.

Principal tasks of technical laboratory dental workers

Tecnico

- Construction of crown and bridge prostheses.
- Co-ordination and supervision of the work of other levels of technical dental laboratory workers.
- Construction (clinical and laboratory) of cast removable prostheses.

Agente

- Construction (clinical and laboratory) of acrylic full and partial prostheses.
- Oral hygiene instruction to groups and individuals.

Auxiliar

- Organization of out-patient dental prosthetic departments.
- Basic dental laboratory procedures including:-
 - casting models
 - preparation of occlusal rims
 - mounting models on articulators
 - cleaning impression trays and flasks.

Courses have been prepared and taught for both agentes and auxiliares on the clinical side. The first participants of these courses have now been working in the field for between six months and one year. An evaluation of their work is to be made later this year and the courses revised in the light of this evaluation. In conclusion it is fair to say that the foundations have been laid and a start made on planning for oral and dental health in Mozambique by the year 2000.

CASE STUDY No. 4 EXPERIENCE LEARNT FROM PRIMARY DENTAL CARE IN SRI LANKA
Dr L.S.W. Dassanayake (Sri Lanka Dental Association)

The first dental course in Sri Lanka was established in 1938, for six post-graduate doctors. It was a two-year course for the licence to practise dentistry. In 1942, the dental school was made a part of the medical faculty and the first batch of dental students passed out in 1947. This resulted in the establishment of the Dental Register. Apart from these there were indigenous practitioners, who practised different aspects of dental care in the form of treatment of toothache, abscesses, and even mis-diagnosed and treated oral cancers and other oral diseases. The Chinese dental mechanics also practised dentistry under the guise of making appliances.

Technology as related to dentistry in Sri Lanka is not diversified as in other developing countries. This could be attributed to the following causes:

1. The lack of problem identification.
2. The inability to meet the demand appropriately and adequately.
3. Socio-economic barriers.

In order to identify the appropriate technologies, the need has to be recognized and analysed. Oral health surveys done in our country are limited and inadequate. The most essential need for Sri Lanka today is a comprehensive oral health survey. Identifying the appropriate technology will come only once the need is determined.

The dentist/population ratio stands today at 1:35,000 people. Fifty students qualify yearly from the school of dentistry. The present total of dentists in active practice is about 400. The Dental Nurses Training School, inaugurated 25 years ago, has an output of 25 school dental nurses a year, with a current number of 340 in the school dental service. These are auxiliaries operating on the New Zealand system of school dental treatment and they are distributed throughout the country in 190 school clinics. They work under supervision of school dental surgeons attached to different districts of the country. There are only a few trained dental technicians attached to the university and the hospitals in the principal towns, in all less than 20.

Epidemiological data on the prevalence of oral and dental diseases presently

available in Sri Lanka is not sufficient to establish, with certainty, the quantitative experiences of dental caries or other oral diseases among the population or for comparison on an international level. However, a few studies carried out on selected groups of individuals throw some light on this. For example, a study of university students showed the caries prevalence to be highest in the central province of the country. It should also be noted that 66 per cent of the total population live in this part of the island.

Further observations made during a study of endemic fluorosis in Sri Lanka by Seneviratne in 1974 corroborate this high caries experience in the central province. The caries experience in the north central province was found to be significantly lower than in the central province due to the presence of fluoride in the water. Periodontal disease, mal-occlusions, and malignant conditions of the oral cavity show a widespread distribution, but it is not so severe as dental caries. There is a relatively high frequency of oral cancer in most countries of South East Asia. Statistics of oral cancers, published by Pindborg in 1977, as a percentage of all cancers on a global basis, shows India to be the highest with 45 to 50 per cent and Sri Lanka comes second with 30 to 35 per cent.

The principal demand of the community at large is the relief of pain and the Government hospital clinics are treatment oriented providing mainly extractions and fillings. Approximately 55 to 60 per cent of all treatment rendered and two-thirds of the dentists' working time is directed towards extractions. The time available for restorations and oral prophylaxis is very limited although the demand is present. The Government of Sri Lanka spends seven per cent of the budget on health services.

A primary health care scheme was launched in Sri Lanka in 1978 by the Sarvodaya Movement, a self-help organization. Government and non-governmental agencies are also beginning to emphasize health care for at-risk groups and for the rural and urban under-privileged.

Unlike primary health care, primary dental care in Sri Lanka has been restricted to a very small proportion of the community. At present regular

dental care through primary prevention is being extended through the school dental service, which caters for less than five per cent of the total child population, in the form of basic restorations, extractions of deciduous teeth under local anaesthesia and oral prophylaxis. Each school dental nurse has a group of 450 to 500 children for whom to provide dental care.

There is a marked absence of any type of preventive service in the country except for the limited work carried out by the school dental nurses, a few dental health education programmes in individual dental offices or hospital clinics. An integrated scheme where dental health education could be incorporated into the primary health care system, could prove to be of much value in a country like ours.

Although Sri Lanka has the highest rate of literacy among South East Asian countries (85 per cent) awareness of dental health has not been given much attention. It is certain that with the proper approach to dental health education through the use of primary health care workers, a better state of awareness could be aroused among the population at large.

The material available for dental health education in Sri Lanka is limited in its quantity and in quality. With the availability of audio-visual materials the message could be relayed to larger audiences with more force and effectiveness.

Of the public health measures available, the topical application of sodium fluoride is being carried out only by the school dental nurses at the training school.

With the deterioration of the state of dental health amongst adolescents and children and the disproportion between the amount of dental treatment which can be provided by the available personnel and the amount of treatment needed by that section of the community, it is essential that dental health education and dental public health programmes should be greatly improved in Sri Lanka by:

1. A National Epidemiological Survey of oral and dental diseases which is

necessary for planning and evaluation of dental diseases in the country.

2. A system of giving appropriate jobs, depending on the skills needed for such tasks as screening procedures, to other auxiliary personnel using short term training programmes.

3. The fluoridation of the drinking water introduced into those parts of the country where fluoride is deficient and the caries rate is high. Only certain parts of Sri Lanka, that is those areas that have a piped water supply, are deficient in fluoride but 66 per cent of the total population live in these areas. The addition of fluoride to the drinking water would be the most effective, practical, economic and beneficial public health measure that could be undertaken in Sri Lanka.

It is necessary to look to the future and embark upon long-term health programmes. We propose for consideration:

- The creation of an improved second dental school in Colombo.
- An increase in the intake of students.
- Expansion of the Dental Nurse Training School to accommodate 50 students.
- The training of dental hygienists.

THE FUNDING OF EDUCATIONAL DEVELOPMENT PROGRAMMES FOR THE 1980'S AND BEYOND

DEVELOPMENT AID IN HEALTH - CONFLICTS, CONSTRAINTS AND PROSPECTS

Dr A. White (Institute of Development Studies)

What I have to present is the result of IDS' investigations into health aid and voluntary agencies in the United Kingdom, the Netherlands, Sweden and a few other countries in 1973 and 1974. I shall be talking about why it is desirable that the kinds of things supported by health aid should be changed, and about the constraints in getting aid into primary care.

We analysed aid from the donor end classifying it into what we considered:

1. Priority areas, i.e. primary care, public health and training for these purposes.
2. Neutral areas, i.e. smaller hospitals, secondary care in general, and the training of personnel for general purposes overseas.
3. The least relevant area, i.e. tertiary care, building of referral hospitals and training in advanced countries in specialities, where the problems would be so different to developing countries that training in advanced countries would not be appropriate.

In Sweden, 76 per cent of all identifiable aid was going to the priority areas, whereas in the United Kingdom the figure was only 4.6 per cent. In France it was even less than the United Kingdom.

Of the aid to the priority area from the United Kingdom, official aid was 5.7 per cent. British voluntary agencies and other non-governmental organizations made up 46 per cent.

For Holland, of the official aid only 2.6 per cent was going to priority areas. Out of aid from the government, but going through free voluntary agencies, 42.6 per cent was for priority purposes. The aid provided by

voluntary agencies in general amounted to 26.2 per cent.

Sweden gave a large amount of aid to Cuba and the Democratic Republic of Vietnam. These countries provide general primary care coverage comprehensively (and are unique among countries receiving aid in doing so). We left this aid out of the classification. If a country is already providing full primary care coverage there ceases to be an argument for devoting aid exclusively to primary health purposes.

The figures show that it is possible for organizations to achieve fairly high levels of aid going to priority areas, but some were doing much less than others.

One has to look further than the distinction between official and voluntary aid agencies as to why more or less goes to priority areas. One has to look at the different kinds of things which are supported by voluntary aid. Training of all kinds in the advanced countries is no less than 27 per cent of official health aid in the United Kingdom; for the Netherlands it is two per cent; and for Sweden it is less than half of one per cent. In Sweden this is a deliberate policy in line with the feeling that it is an inappropriate type of training and therefore aid.

We did a special analysis of the United Kingdom fellowships. At least 38 per cent could be said to be going to things which were of very little relevance to the priority needs of developing countries. Three-quarters of this allowance was going to tertiary specialization of some sort.

Aid agencies supporting personnel overseas took in the British case 18 per cent of the total, in the Dutch case probably five per cent, and in the Swedish, probably four per cent. For the supplemented positions from Britain only a very small proportion was relevant to primary care.

We did not make any detailed analysis of the types of research or the support given to research, which accounted for something like 12 to 15 per cent of the aid. In general, enough is known about the problems of health in Third World countries to make enormous differences in the levels of health without

doing a great deal of research. There was a tendency in countries other than Britain, for aid to support investigations into primary care.

Capital aid is the major thing, which includes hospital building and the provision of equipment, extensions, etc. Thirty-three per cent in the case of the United Kingdom, 18 per cent of direct Dutch aid and 75 per cent of the gross amount of Swedish aid. The Swedish aid financed mainly primary level programmes. In general, these included nation-wide programmes for health clinics etc., mainly in African countries. The health aid provided by Britain went into a wide range of projects.

Finally, there is co-financing by non-governmental organizations (NGO's). Some finance comes from the government agency and some from the voluntary agency and some from the recipient voluntary agency. The British figure in 1973 was still less than half of one per cent of total aid. Dutch aid comes very largely from co-financing programmes, one Protestant, one Catholic, and one secular agency. About ten per cent of Swedish aid does as well.

In Britain voluntary agency aid is much greater in the health field than it is as a proportion of general aid. Voluntary agencies spend something like one-fifth of their aid on health compared with the three per cent on health which is the proportion of government aid, so although they account for ten per cent or less of all aid, they account for 20 per cent to 40 per cent of health aid.

We also classified voluntary aid in five different categories:

1. Children's funds accounted for 16 per cent of British voluntary agency health aid, largely in setting up Mother and Child Health (MCH) clinics; unfortunately these were very expensive and largely manned by expatriates.
2. Thirteen per cent was provided by agencies concerned with particular diseases, especially leprosy.
3. There were agencies providing medical supplies - this was very important in the case of the Netherlands, where it accounted for over 30 per cent of

aid, but it was only six per cent in Britain.

4. Then we had the missionary societies supplying aid for missionaries and nurses, which was no less than 43 per cent.

5. The other 22 per cent was given by general agencies like Oxfam which supports help in all general development fields. It was, in fact, Oxfam and similar agencies which appear to have supported the most desirable primary form of health care.

Health programmes run by the general agencies and supporting experiments in bringing health care into areas not covered by the government are a particularly valuable part of voluntary aid work.

The policies of voluntary agencies can be classified according to the general aims of such agencies. I usually start with the Oxfam slogan: "Teach a man to fish so that he can eat for life". Compare this with other voluntary agencies using the emotional slogan "Give a man a fish so that he can follow God." This does not lead to large-scale primary health care in general. "Give a man a fish so that he can eat" with no questions asked - leads to a concentration on the setting up of relief programmes, not the setting up of primary health care programmes, but of course it is essential for people in the greatest need today. Another orientation of some voluntary organizations is to show people how they are being exploited, denied the benefits of their fishing or access to their fishing grounds. That orientation has been put into effect very well by certain agencies which start from the health angle and go on to basic health care. They try to change the structure of the village slowly by getting some political influence at the local level.

Turning to the policies of governments, all the countries that we have discussed - the Netherlands, Sweden, and the United Kingdom - had by 1974 adopted the policy of providing health aid primarily for rural and primary care purposes. They were experiencing difficulties in putting this generally agreed policy into effect.

In putting them into practice, the orientation of the recipient is perhaps

the biggest constraint. Most recipients generally push for aid for the more advanced regions as opposed to the donors' preference for giving aid to high priority areas.

There seems to be less general support for the new directions in the United Kingdom than in Sweden. This is partly reflected in the internal organization of health aid agencies. In Sweden, the health unit consists of a dozen people with a director who is not a doctor. They supervise the entire process of health aid. Therefore they can take a line and insist very strongly on that line being reflected in all the health aid they give. That contrasts with the British situation where you have three medical officers, a senior one and two others, who are consultants. It is the regional offices which have the major day-to-day familiarity with the aid programmes, and possible new programmes.

Sweden has its representation in developing countries. All Swedish health aid is given to 12 countries. So although Sweden formerly said aid should be used by developing countries according to their own priorities, they ensured through those development assistance offices that at least the views of Sweden are well known to people in the recipient countries. They thereby got requests for the kinds of aid which they want to give to a much greater extent than the United Kingdom.

Finally, there are biases of various kinds, particularly against local and recurrent costs. Those are the kinds of costs needed on a large scale in health programmes to meet priority needs. You need to have village health workers paid and trained. There is bias in favour of buildings and hardware, and particularly against the indefinite payment of recurrent costs. There are attempts to reduce the bias in some cases by providing salaries - 100 per cent salaries for the first year and 50 per cent for the second year and so on, and then after five years the salaries are taken over by the recipient countries.

A lot of aid is still tied to buying goods or services from developed countries. For instance, British aid to Brazil and Colombia is a good example of tied aid. It was only given because it was tied to British procurement. There is also the bias in favour of defined projects. People want to have

something which looks finished at the end of it. The Swedes got round this to some extent by making their projects into rolling long-term programmes and committing sums several years in advance but revising them annually. There is a particular bias in favour of spending large amounts of money for a single project such as a hospital. It could be a large-scale training programme for primary health care, but only if the recipient country is willing to change its whole approach to rural health care.

What can be done in the future about aid? What is the general purpose? To meet the basic needs of the people, or to improve the capacity of the people in the developing countries to meet their own needs? In a number of the contemporary programmes, particularly in WHO and related international organizations, the concern of spreading services to the whole of the population is, I would say, at least superficially, a highly laudable aim. The problem is that this is a vision in which less than one per cent of the wealth produced in a developed part of the world is going to be set aside for meeting the basic needs of people in the poorer countries and therefore keeping them politically quiet as they are getting at least their basic health needs and their shelter. The economy is going to be based on capital-intensive production which does not need that large a number of people.

The alternative is that each developing country uses its whole manpower resources effectively in engineering the development which meets not only the present basic needs of all its people but increasingly the needs of the people as they develop. That can only be done if the developing countries take themselves out of the existing trading system.

Of course, imports will be needed to meet bottlenecks in implementing such a policy. However, the perpetuation of the pattern of trade, the importation of capital for industrial equipment that uses few workers to produce goods largely for the minority of the population in the middle class is what causes the poverty of the developing world. It is only by getting out of that whole cycle that the needs of the poor are met and not just their basic needs, which is all that health aid can do.

THE PROMOTION OF INTERNATIONAL EXCHANGE OF STUDENTS AND STAFF

Professor G.N. Davies (Deputy Vice-Chancellor, University of Queensland)

Since I have circulated a very comprehensive abstract (Appendix I) of my views on the promotion of international exchange of students and staff, it is not my intention to repeat all that has been said there. Rather I should like to emphasize or perhaps re-emphasize some of the important points.

When it was founded, WHO defined health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. It is my conviction that to try and achieve that objective by the year 2000 is absurd. What WHO really means, I hope, is the achievement of a level of health that will permit all people to live a socially and economically productive life. That more realistic assessment is close to but neither as comprehensive nor as realistic as that proposed by Galen 1700 years ago. He described health as an abstract state which no one attained. It was, he said, a state of reasonable functioning and freedom from pain. As Aubrey Sheiham said yesterday, what we should be aiming to do is to have people die with all their teeth present. And does it matter if they have got 3 or 4 or 5mm. periodontal pockets? When one dies one is not very fit anyway.

If we want to promote international exchange of students in dentistry or any other field for that matter, we must first define the objective of any such programme.

I have listed eight factors which I think suggest the importance of academic mobility (Appendix I, section 1).

I should like to stress the importance of overcoming professional isolation of both specialists and, in so many developing countries, of general practitioners as well. I should also like to stress that the ultimate object of any international aid scheme is to promote self-reliance and self-sufficiency in recipient countries - to achieve true independence, not dependence. I strongly support the concept of encouraging regional co-operation and self-help. Developed countries can advise and propose but consent and implementation are fundamentally the responsibility of the

recipient developing countries.

The eight points I have made under the heading 'Barriers to international mobility' (Appendix I, section 2) are also self-evident, but the seventh, namely the "real or implied possibility of a brain drain" is one that requires more detailed consideration. It is tragic when the very limited resources of developing countries are devoted to providing a basic education for their brightest sons and daughters, only to find that they take advantage of the opportunities so created and devote the bulk of their professional life to the service of a developed country in which similar opportunities for their own nationals are severely restricted by quotas on entry to professional faculties in universities. This, of course, is a very delicate matter. Indeed it is a no-win situation because the political decision, whatever it is, can be (and often is) accused of being the outcome of deliberate, direct or reverse discrimination of one sort or another.

I draw your attention to the British Council definition of academic links and to the manner in which such links are generally formed. Developmental links are mutually beneficial and should be founded on genuine interest and concern and not based on emotion or sentiment.

The statements in the abstract supplemented by the tabled documents on the various types of assistance that are available are factual but incomplete. It would be helpful if other sources of assistance could be disclosed such as, for example, DANIDA and Dental Health International Nederland.

I am delighted that the possibility of establishing a Commonwealth Dental Association sponsored by the FDI is being explored.

Under the role of the Association of Commonwealth Universities I draw your attention specifically to the proposal to overcome the problem of filling intractable vacancies by the attachment of teachers on study leave, special leave, or post-retirement leave.

ORGANIZED DENTISTRY'S CAPABILITY TO RESPOND AT THE LEVEL OF PRIMARY
HEALTH CARE

RESPONSES OF THE FDI

Dr J.E. Ahlberg (Executive Director, International Dental Federation)

As noted in Appendix II the FDI is an organization of dentists and the entire response of the FDI must be seen in this context. We are in business to promote contact between dentists in different parts of the world, to create international interest in order to elevate the status of the profession and to create programmes for promoting the dental health of the general public.

This places several constraints on the FDI at the same time as it gives opportunities. We can only act by convincing the membership of the FDI about the activities we should pursue. More than 80 per cent of the members of the FDI come from industrialized countries.

One thing is to convince the membership of the dental profession about the goals for the future. We are now discussing "Goals for oral health by the year 2000". There is a great need for the dental profession to design its future. One thing we need to define is "what is primary health care"? Dentists in industrialized countries must appreciate that these are problems as much in their own interests as in the interests of the profession in developing countries.

Changing disease patterns will provoke enormous changes with potential dangers for the dental profession unless it is aware of what is going to happen in the future.

I have outlined in Appendix II the possibilities we have of disseminating this information to our member associations, and through them to our colleagues. Potentially the number of colleagues we can reach in this way is something like 350 to 400 thousand.

As an independent non-governmental organization we can basically tell governments and inter-governmental organizations what we feel they should hear.

We have one constraint; we normally do not act directly with national governments. The national organizations act on our behalf or in the light of their own experience and specify what the problem is in relation to their own conditions. One example of a basic problem we have in relation to developing countries is how to convince national governments and governmental organizations such as SIDA, in Sweden, to give higher priority to dental health.

A second important field, which the FDI is involved in already, is research of various types, through the standing commissions with their working groups and together with WHO. The potential for the FDI taking up different projects is great. The possibilities for very costly research will always be quite limited.

A third function within the FDI is to act as a catalyst for professional contacts in the form of educational exchange and dental manpower deployment.

Regular contact at regional level is one of the things we have aimed at creating in developing countries, amongst other things with the Secretariats, mentioned in Appendix II. It is very desirable but very difficult to achieve a better contact on a regional level.

I would like to mention specifically The Tropical Dental Journal which is an attempt to create the first professional journal in dentistry for developing countries. It was made possible by means of a grant from the Commonwealth Foundation. The purpose of it is to break some of the isolation and also to provide a forum for the publication of research results from developing countries. These functions have been filled very successfully, except for one thing - it is not getting the support in the form of subscriptions either from colleagues or dental schools and laboratories which is needed for it to be financially viable.

One further means of regular contact is the meetings of Chief Dental Officers linked to our annual dental congresses. They are not, of course, devoted exclusively to developing countries, but provide a useful way for industrialized and developing countries to discuss topics such as goals for oral health, manpower deployment and the need to develop robust and simple equipment specifically for developing countries.

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TRAINING IN DENTAL PUBLIC HEALTH

Professor Ingolf J. Møller (World Health Organization)

The needs for oral health manpower trained in dental public health are constantly increasing and will no doubt continue to do so in the future. Five factors are largely responsible for these growing needs:

1. The rapid increase of the world's population.
2. The rising personal expectations and demands for oral health care.
3. The fact that governments are assuming greater responsibility for personal as well as community health, with the result that health care systems are becoming more oriented towards public health.
4. The rapid improvements being made in dental public health technology equipment, development of effective mass preventive measures, performance levels, which call for continuing quantitative and qualitative changes in the oral health manpower structure.
5. The fact that the cost of comprehensive treatment of caries and periodontal diseases is becoming prohibitive even in the richest of the world economies, calls for cheaper and more effective oral health care systems which presumably can only be achieved through a public health approach.

The diagnosis of community oral health problems, the planning and administration of dental care programmes, the determination of a country's dental manpower needs, research to improve the organization of dental health services, are some examples of the tasks facing public health dentists.

The growing awareness of government's responsibility to provide health care for all has led to an increasing interest in the promotion and enforcement of public health services in which dental public health care is an integrated part.

The trend towards more and more government sponsored dental public health

programmes makes it important that all dentists, including those who will be engaged solely or primarily in private practice, be much better prepared to fit into the society of the future.

There is a need, therefore, for increased opportunities and emphasis on dental public health training at both the undergraduate and postgraduate level.

Undergraduate training in dental public health

The development of departments of preventive and community dentistry in the dental schools has come about through an interaction between dissatisfaction and innovation. Dissatisfaction with the product of traditional dental education has arisen from both inside and outside the dental profession.

Until recently, dental education had been oriented towards disease and repair. Dentists were prepared for practice as solo operators with almost no instruction in the use of auxiliary personnel. Few educators had recognized the need to increase the dentist's capability to function in organized community health programmes, and courses tailored to this need have developed only very slowly. The traditional dental graduate was a skilled, disease-oriented technician with some biological background, but often without the interest or skill to increase his effectiveness through practice of preventive dentistry, increased practice efficiency, use of the team approach and involvement in dental public health activities.

From outside the profession, dissatisfaction with the traditional dental graduate has been expressed by the consumers of oral health services and by those administrators responsible for the community's health. The oral health needs of the public are not being met. The health needs have differed greatly among different groups of people, but services have not been made available, accessible, or acceptable to those who need them the most. However, changes in dental education have gradually been influenced by an increasing awareness of the responsibility of governments to provide oral health services for the total population. These changes which for a considerable number of dental schools in the USA, Northern Europe, Australia and New Zealand took place in the late fifties and in the sixties consisted of a re-organization of the

dental curriculum to provide for the consolidation of teaching and research in public health and related subjects; for example, epidemiology, biostatistics, preventive dentistry, social and economic relations, ethics and jurisprudence and teamwork with auxiliary personnel.

However, experiences have shown that it is not enough just to change the dental curriculum. The educational goals or teaching objectives should also include a strong element of behavioural sciences aimed at motivating not only the students but also the teachers to develop a philosophy based on the premise that the ultimate goal of the dental profession is to be responsible for and to provide the highest possible level of oral health for each individual in the society.

This concept is perhaps of particular relevance to the developing part of the world where the effective and efficient utilization of the very scarce resources in terms of budgetary allocations, manpower and equipment can only be effected if proper public health planning is instituted.

Unfortunately the dental curriculum in most dental schools in the developing part of the world has been copied from schools in the technically highly developed countries without really modifying it to suit the conditions in their own countries.

In order to provide the community with dentists who have at least some basic knowledge in dental public health it is absolutely indispensable that the dental curriculum in most dental schools be reorientated to include a strong element of basic dental public health training. Subjects to be included under dental public health should be taught throughout the undergraduate course. If no separate department is created, responsibility for co-ordinating the various disciplines should lie with a specific department.

If the dental school plans to provide postgraduate training in dental public health the need for establishing a separate department must be obvious.

Postgraduate training in dental public health

The special skills needed by a dentist who wishes to orientate his career towards public health fully justify the development of dental public health as a speciality. However, it is a speciality of a different type from the others. Instead of studying one of the dental disciplines in depth the public health dentist has to go beyond the field of dentistry and familiarize himself with a number of disciplines in the field of general public health and the social and behavioural sciences.

The 1966 Conference of Directors of Schools of Public Health listed seven essential components in a postgraduate training programme in public health:

1. Biological sciences in public health, including microbiology, genetics, biochemistry, and physiology.
2. Social sciences in public health, including the behavioural sciences, economy, and political science.
3. Statistics and demography.
4. Epidemiology, including survey and research methods.
5. Environmental health.
6. Administration, legislation, planning and evaluation in public health and medical care, including social security and health insurance.
7. Health education.

Field experience in dental public health and some of its specialities should constitute a natural component in the training programme.

The number of schools providing postgraduate training in public health in the world today is approximately 125 with close to 100 located in Europe and North America. Very few, as far as I know only five or six, of these schools offer special courses in dental public health.

Some schools offer dental public health as elective courses to the core course in basic public health leading to a formal degree in general public health (DPH, MPH or doctorate). The diploma courses or master programmes usually last one academic year. To achieve real specialization additional training would be necessary.

With the extremely low number of schools of public health in the developing part of the world most dentists from these countries are forced to obtain their formal postgraduate training in dental public health in the United States, Europe, Australia or New Zealand in public health schools which provide courses that are not necessarily geared to the situation or problems which prevail in their home countries.

There are a few but fortunately increasing number of dental schools which provide postgraduate training in dental public health. However, the situation with regard to the geographical distribution is the same as for schools of public health.

Apart from the formal training at postgraduate level, various needs have to be met and the training offered should be adjusted to them. In countries with a large public sector in dental health services, dentists working at the operational level may need in-service training courses in dental public health in combination with or in addition to continuing education in clinical disciplines. These courses may include administrative subjects together with some notions of dental epidemiology, operational research and field training, bearing in mind the communities where the services are being rendered.

As dentists move up the ladder of the administrative hierarchy in the dental health services, additional refresher or upgrading courses may be developed for them, including more dental and general public health subjects. These courses may be useful at the national as well as international level, to serve countries where formal courses in dental public health do not exist or are not deemed necessary.

Whenever possible it is desirable that public health dentists be trained in association with members of other health professions in schools of public

health or their equivalent. If training is offered at a dental school, a multi-professional staff is necessary. One could also think of the possibility that dentists would attend the core courses in general public health at the school of public health and the specific dental courses in a dental school.

The familiar epidemiological and demographic situation of the developing countries, together with their limited budgetary resources and acute scarcity of trained manpower, has created special, urgent requirements in relation to public health education in these countries. This means that the introduction of the modern managerial curriculum is more important for the future than for meeting immediate requirements. Because the provision of primary personal and community health care for rural populations - commonly amounting to 80 per cent of the total population in these countries - has a very high priority, dentists will have to be given a more comprehensive training in public health than is usual at the undergraduate level on the assumption that most of them will, or at least ought to, enter the basic care services, where they must have broad professional competence in this aspect of health.

Examples from the work of WHO in the field of training in dental public health

The World Health Organization's Oral Health Unit has been involved in several activities related to training in dental public health. I would like to illustrate this by giving you an example from one country, namely Thailand.

In 1965 the Danish International Development Agency (DANIDA) started a series of yearly courses in Child Dental Health in collaboration with the World Health Organization. These courses lasted three months and were attended each year by approximately 20 participants from different developing countries.

Experience from these courses resulted in the start of the first WHO/DANIDA Course in Dental Public Health which took place in 1971 in Aarhus followed by similar courses in 1973 and 1975 in Copenhagen. This series of courses was residential and the teaching methodology was changed from a one-way communication approach to seminars, workshops and group discussions with the teachers acting as moderators or consultants.

In 1978 it was decided that future courses ought to take place under conditions which were more likely to be those under which the participants would work after returning to their home countries. For the first time, therefore, the 1979 course was placed outside Denmark, in Bangkok, Thailand, where the Faculty of Public Health, Mahidol University kindly provided the physical facilities at the faculty as well as practical training possibilities at the faculty's training centre in Soong Nern about 200 kilometres north-east of Bangkok.

The main objective of the course was to provide the participants with a sound understanding of dental public health problems particularly for rural and underserved population groups in developing countries.

The course contents were as follows:

1. Oral epidemiology.
2. Identification of treatment needs.
3. Oral disease preventive measures.
4. Psycho-social aspects of dentistry.
5. Oral health criteria for community diagnosis.
6. Planning of oral health surveys.
7. Field excursion for collection of data.
8. Analysis and evaluation of data.
9. Planning of preventive services.
10. Planning of health education programmes.
11. Planning of manpower development.
12. Organization, administration and evaluation of oral health care services.

The majority of previous participants in these courses now occupy key positions in their home countries. The fact that we have such key persons in practically all developing countries has been instrumental in the success of the World Health Organization's Oral Health Programme.

The success of these courses and the fact that they have never been able to saturate the need for this type of training led to the idea of establishing a permanent Training and Demonstration Centre in Oral Health. The proposal was discussed with the Thai Government which agreed to be the host country for

the centre which is now being established in Chiang Mai in northern Thailand. The centre will initially be known as the Thailand Training and Demonstration Centre for Oral Health, but the accent will be on technical co-operation between developing countries (TCDC) so that the operation will be of an inter-country and, eventually, inter-regional nature.

The overall objective of the centre is to stimulate and strengthen the interest - in a collaborate effort - to improve the oral health status of the people in the region.

The centre will therefore be used for many purposes which can be subdivided into intramural and extramural activities:

Intramural activities:

1. To serve as the physical base for courses, seminars, workshop meetings etc. It is expected that some of these activities will be provided as "package" courses by interested donor countries.

2. Clinical activities - for in-service training and upgrading of professional and auxiliary personnel, for the development of simple clinical techniques and procedures and for testing preventive regimes before they are released for field use.

3. Laboratory research - to support field demonstration programmes and to perform research of relevance to dental public health.

4. Library facilities - with the main purpose of establishing an information service system for the region.

Extramural activities:

1. Initiation of field research projects which are of particular relevance to the region.

2. Implementation of field demonstration programmes as a continuing activity for evaluating different oral disease preventive programmes and for the development of alternative approaches to the delivery of dental care adjusted

to local environmental conditions.

Even though the Thai Government and WHO have contributed a considerable amount of money for the establishment of the centre, the extent of the centre's future activities will depend heavily upon assistance from other sources. However, we are optimistic about this and hope that various governmental and non-governmental institutions will support the centre either with funds or in kind.

During the course of my work in Thailand I have also had the pleasure of assisting the Thai Government in the planning and implementation of a National Oral Health Survey, the results of which will be transformed into action indicators and strategies for use in the preparation of the next five year Plan for Oral Health. This collaboration has also resulted in the establishment of undergraduate courses in dental public health in all dental schools in Thailand and plans for introducing a major course in dental public health at the Faculty of Public Health, Mahidol University in Bangkok.

From my own personal experience I think that a very important topic to be discussed in this session is: how can we improve our collaboration with and within developing countries in an effort to strengthen the concept of dental public health in training programmes as well as a tool for improving the oral health status of the world's population?

References relating to this paper can be found in Appendix III.

Note: This and the following paper were discussed together after Dr Hobdell's presentation.

CURRICULUM DEVELOPMENT AND EDUCATIONAL RESOURCE MATERIALS

Dr Martin Hobdell (The London Hospital Medical College Dental School)

Introduction

The ideas contained in this paper have evolved out of many years experience of teaching and research in western dental schools both in the United Kingdom and North America, and of organizing and teaching courses to auxiliary dental personnel in Europe and Mozambique. They are offered as a rational attempt to overcome some of the major disadvantages inherent in the conventional northern European system. It is believed that by surmounting these problems a significant advance in the field of dental education could be made. Further, that the diploma or degree resulting from the courses offered would not only be of equivalent academic standing to those provided by conventional dental schools but would also be more relevant to the dental health needs of the people of developing countries.

Frequently, although the need for an auxiliary training school with or without a dental school may be recognized, no absolute figure can be placed on the numbers of students to be trained; nor the funding nor staff available. All of which may vary with time and other less predictable factors such as internal production; government policy in respect of aid and external governments' willingness to contribute or indeed the many variables that control the availability of foreign exchange.

The suggestions that follow incorporate a mechanism by which epidemiological data and their health policy implications may be utilized in the design and planning of the curriculum both in the preliminary phase and as a regular element of curriculum development and review. Further, they suggest how the training of other dental personnel may be linked with that of dentists. As a background therefore three guiding principles have been taken:

1. That the training of dentists and others should nurture the highest ideals of dental care which will be carried into all future work for the community after graduation.
2. That the teaching of the dental institution should clearly reflect the

dental needs of the nation.

3. That the relevancy of the training given should constantly be maintained by active participation in field work and clinical (field) research.

The organization and curricula of western dental schools have evolved gradually as dentistry has passed from being a craft to a science. Unfortunately the growing awareness of the community aspects of health care has yet to be reflected in the way in which western dentists are trained.

Not unnaturally there is an emphasis on the community aspects of health care in Third World countries with progressive philosophies, where pressures on scarce resources are great. The major limitation of the training now being given in most western institutions is that it conflicts with the philosophy of community care - rather it reinforces the free enterprise, market-place values on which the economies of these countries are based. This conflict has become obvious in those Third World countries which have opened new dental schools based entirely on the western model. Although the graduates of these schools are excellent dentists in their own right they lack a commitment to the dental health care of the community. And their clinical interests lie in areas often irrelevant to the needs of the majority of the population. This results in them restricting their services to relatively small groups of private patients - they have acquired the values inherent in the western dental education system.

To overcome this problem, but at the same time retaining the positive aspects of the western system, the following alternative training scheme is offered.

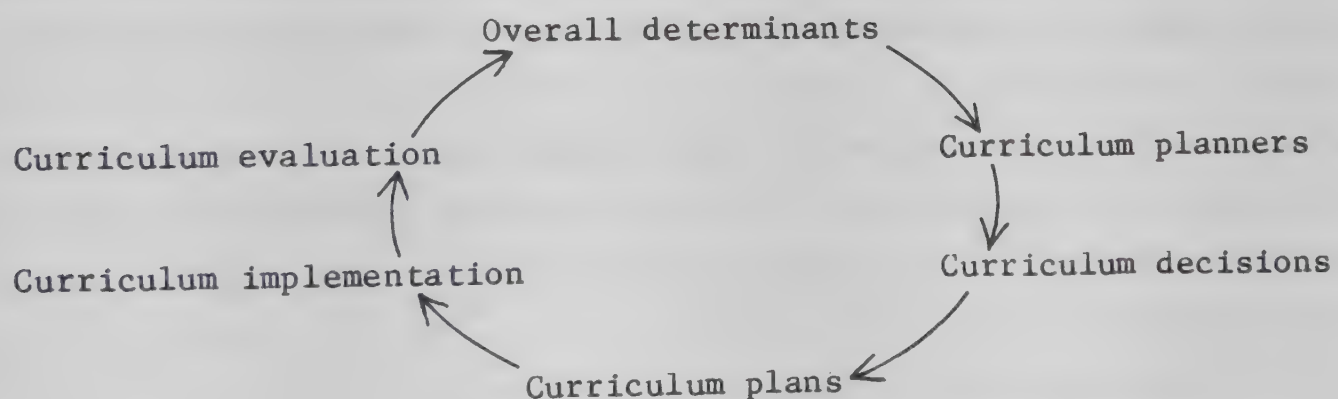
Designing a curriculum - a philosophy

One of the major problems in designing a curriculum is that it is different things to different people. Generally it is regarded as a programme of instruction for an educational institution. To students, a curriculum is usually an array of required or elective courses that must be taken in order to graduate. To teachers, a curriculum may be a sequence of packages of knowledge to be taught in certain ways at certain times by subject specialists. To administrators, a curriculum is a way of organizing and

departmentalizing a school into manageable units. To society, a curriculum represents a series of activities designed to prepare students for their future roles in the community. With a curriculum being seen to serve so many valid functions, it is obvious that it must synthesize all these elements into a meaningful plan that gives due consideration to both the process and the product of dental education.

A curriculum model

A commonly used system for designing a curriculum is based on a static linear model which goes through a series of stages from planning to the final stage of implementation. By adding one further stage - evaluation - a looped or circular model is created. The first step in this model is to define those factors that must ultimately determine the overall structure of the curriculum. In the light of these, curriculum planners can make decisions and draw up curriculum plans. These can then be implemented and evaluated in the light of the criteria set by the original determining factors.



As a result of the cyclical process the curriculum is under regular review and can be adjusted to reflect the changing circumstances of any of the curriculum determinants. There are four major factors that determine overall curriculum form, both in terms of the need for and the scope of the education to be provided.

1. Academic factors These are probably the most significant as the major purpose of education is to pass on the organized body of knowledge which each discipline has evolved. It is necessary however to strike a balance between the purely academic determinants and the other factors.

2. Social factors Dental needs should influence curriculum development and there should be an acknowledgement that such needs vary among groups within the country and over time.

3. Economic factors These will influence both the kind of dental health personnel to be trained and the nature of the curriculum. For example in a country with about 16 dentists and a population of 12 millions, it seems only rational to plan a curriculum that prepares dentists for the role of team leader rather than as single-handed operators. An institution which is likely to have a low budget per student should consciously plan a different kind of curriculum from one which has a high budget and not merely allow the economic problem to become a factor which has to be dealt with after curriculum planning has been completed. Feasibility as well as desirability should be the aim.

4. Political factors Such factors operate at all levels in the community and cannot be ignored. They will influence curriculum planning but they should be dealt with fairly in relation to the other three factors listed above.

Naturally conflict will arise in determining priorities in respect of the four factors just described. The anxieties and frustrations that result should be channelled into constructive criticism in the dynamic process of planning a dental curriculum.

The objectives of the curriculum

The main objective for teaching dentistry is the production of dental personnel who are socially conscious, community oriented and technically competent. On a personal level this means that the oral health worker, at his or her defined level should be able to:

1. Discriminate between relevant and irrelevant features of the environment that are conducive to good dental health.
2. Produce effective action using the relevant skills - whether cognitive, communicative or technical - in the prevention and treatment of oral disease

at both the community and individual level.

3. To act scientifically in the continuous acquisition of new knowledge and skills which will further contribute to the achievement of oral health for the community.

4. Adapt to change.

5. Respond to human problems sensitively and be conscious of his or her role as a member of the health team.

6. Act responsibly in social, cultural and economic affairs.

Organization of the curriculum

The outline which follows is designed to achieve these objectives through motivating the students from the start by clearly defining the goals to be achieved at each stage and by reinforcing what has been learnt by the rapid translation of theory into practice at all levels of training. It is also designed to allow for the training of all dental health workers together for the maximum amount of time although their parent training institutions may be in physically different locations.

General description

The training course is based in a dental public health service centre. This centre should be a division of the principal school of dentistry, with direct links to other university departments. The students spend part of their time either in auxiliary or dental schools (where course material is complementary) and part working in field clinics.

Dental public health service centre

This should be the first fully established division of the auxiliary training school or dental school. Initially it will be responsible for:

1. Co-operating fully in the planning and execution of national dental epidemiological surveys with the help of short-term WHO consultants.

2. Developing with the co-operation of the Ministry of Health and senior faculty members the curriculum implications of the epidemiological data.

After the implementation of the curriculum the centre will be responsible for:

1. Monitoring the performance (and relevance) of all levels of personnel in the field.
2. Monitoring the changes in oral health achieved by different systems of providing care in the field.
3. Advising the Ministry of Health and the curriculum committee of the school of these changes as part of their regular curriculum reviews.
4. Providing postgraduate courses in dental public health initially as in service training but later in preparation for a diploma in dental public health.

Alternation between dental school (or auxiliary school) and field service centres

All dental personnel should take the initial elements of the course. For example basic personal and public hygiene, introductory anatomy, physiology, pharmacology, first aid, general dental assisting. After which all will go into the field to act as general dental assistants in existing health centres and field stations. After a specified time in the field they will return to their respective schools for the next part of training which will build on the experience gained in the field as well as the previous theoretical and didactic courses. This alternation will be repeated throughout the course. Not all personnel will move through the course at the same speed. Thus for dental assistants the initial field experience might be much longer than for the dental undergraduates from the dental school.

Differentiation into different skill levels

There are various levels of training. When a person reaches a particular level they should be given the opportunity of regular field service at that

level or of continuing in training to the next level should the health statistics and plans show a need for an increase in staff numbers at that next level. Thus the system described, by constant reference to the data gathered by the dental public health service centre, would provide a means by which the numbers and skill levels of the staff in the field could be matched to the dental needs and wants of the community. The same would be true at the top of the training programme when consideration is given to the need for dental specialists.

Integration of dentist and auxiliary personnel training

The curriculum organization described uses the dental auxiliary school and the dental school as resource centres, where initial theoretical and didactic training are given. The bulk of the practical training would, however, be carried out in the field service centres. If it proves possible to locate both dental and auxiliary schools together then many basic facilities and courses could be shared. However the system described does not necessarily require this as both dental students and trainee dental auxiliary personnel will be carrying out field placements in the field service centres together as teams. With careful time-tabling it should prove possible to get the maximum use out of both the capital resources in the field and those of the dental school and auxiliary school. By using the existing field services the number of personnel in training could be substantially increased for any given investment in new dental school facilities.

Teaching in the field service centres

It is believed that the existing health centres and small field stations situated within a country provide the most appropriate environment in which students should gain the majority of their clinical experience. True hospital practice should form a small part of auxiliary or undergraduate experience but a major element in the postgraduate training of dental specialists.

Part of the initial work of the dental public health service centre should be to identify those field clinics and personnel most suitable for use as training centres. Staff from these centres should be recruited and given in-service training to equip them as teachers. It is believed that any reduction in the amount of service provided would be adequately compensated for by the

work of the students.

The personnel to be trained

This, as has been stressed, must be dependent upon the information derived from the epidemiological surveys. However three groups of workers are fundamental:

- Dental specialists - Probable fields: oral surgery, oral pathology and oral medicine (including periodontology), public health dentistry.
- General dental practitioners - initially the main purpose of the dental school course is to provide graduates at this level.
- Auxiliary dental personnel - for example, hygienists, dental therapists etc.

Selection of personnel for training

Initially from within the auxiliary personnel already in the field. The advantage of this is that:

1. Those who had demonstrated both skill and a commitment to community-based care could be selected.
2. With existing services sited in those areas with the greatest need, the upgrading of the present staff's skills would enhance the service offered in those areas of greatest need.

The advantages of the suggested system over western methods

1. It provides a dental education (for all personnel) which is relevant to the health needs of the people. Its continuing relevance is provided for through the work of the dental public health service centre.
2. It is flexible, allowing for the careful regulation of numbers and types of dental health workers trained.
3. Theory is translated into practice in the field service environment from the start.
4. Because of the evolutionary nature of the system capital expenditure can

be spread over a longer period of time.

5. For the same reason growth in recurrent expenditure - training staff salaries, materials and instruments - would be gradual.

6. By using many of those already in service in the field as clinical teachers and supervisors, continuing education courses can be incorporated as part of their regular contact with the dental school.

7. By providing a comprehensive career structure the job satisfaction of all workers is enhanced.

Curriculum content

The balance between different parts of the course can only be developed in relation to the findings of the epidemiological surveys.

Conclusions

The situation as it evolved in Mozambique illustrates what I have just outlined. There were basically four levels of clinical worker (three operating and one non-operating) and there was the possibility of going out into the community and providing clinical service and then coming back for further training.

The other important point is that the Ministry of Health made a decision that there would be no more than four levels of clinical worker.

Having decided on the four levels, two decisions had to be made:

1. What were the tasks that were going to be encompassed by those four levels?

2. How were the tasks going to be divided between those four levels?

These were defined clearly by the Ministry in 1979. For example, the Agente that has already begun to be trained, has tasks divided into preventive, technical, treatment, relations with the patients and other operators,

technical, treatment, relations with the patients and other operators, maintenance and administration, and finally education. In consequence the division of labour between the different divisions of worker has been designed. Thereby the writing of the curriculum is facilitated.

The curriculum was written from the practical point of view of what people are going to be able to do at the end of the course. As a result of having decided what the tasks were, it was possible to state exactly what equipment would be necessary: mirrors, probes, etc.

Even that is not enough because, having said what tasks people are going to do and what diseases are to be treated, it is necessary to say how these are going to be treated. Twelve therapeutic schemes were designed and published. Such schemes have an important effect upon the importation of drugs and equipment, the standardization of procedures and hence the curriculum.

OPTIONS FOR THE FUTURE

Professor H.L. Bailit (School of Dental Medicine, Connecticut)

I do not consider myself an expert in this area. I have spent a little time in developing countries, but mainly as a researcher rather than as a demonstrator of dental programmes, so I come here probably with more enthusiasm than expertise.

When I received the invitation to this meeting, Dr Ahlberg mentioned one or two things - the transfer of technology across national boundaries and the implications for oral health. He asked me to make a summary of the symposium giving some options for the future.

The first thing is: "What do you mean by technology?" This includes the equipment, facilities, supplies, organization and knowledge related to the prevention and the treatment of dental disease. To some extent we have focused on technology in a very limited sense in regard to the equipment we use. Technology goes much beyond that because through technology you can change people's behaviour. At the individual patient level we are concerned just as much with that technology as you are with the technology of dental equipment. The other thing is what I mean when referring to the transfer of technology.

There are a number of national or state organizations that have the specific goal of selecting technologies for transfer to another country. Then you have the recipients, who are also discriminating as to what kind of technology they are going to accept. There are basic social and economic forces in both developed and developing countries which promote the transfer of expensive curative technologies produced by a smaller segment of the population which is located in urban areas. These technologies are unlikely to benefit the large majority of people who live in rural areas.

There are many organizations actively concerned with the transfer of oral health and educational technologies: private industry, government and professional organizations - I would like to put the dental education institution and national dental associations together to form a whole series

of national and international organizations. I appreciate that organizations can have a substantial impact on improving oral health, even if this is not their primary goal.

Although each of these organizations has an interest in improving oral health, most are constrained in the approach to achieving this goal by other goals which take precedence.

The transfer organizations with the greatest resources, industry and the government, have incentives to transfer technologies which make profit or increase the donor countries' visibility and influence. This was nicely pointed out in the presentation by Dr White, who showed very clearly that voluntary organizations were transferring much more primary health care technology, whereas governments were much more interested in tertiary health care than primary technology. In both cases, however, extensive curative technologies are likely to have priority. Developing countries have multiple transfer recipients. In some situations, the vested interests of the transfer agents and recipient organizations are similar - for example, the dental profession in both the developed and developing countries may have more interest in technologies for the prevention or cure of disease which are applied at the individual patient level.

It is up to national and international health organizations such as AHRTAG or WHO and others to convince governments in developing countries that they should select technologies which will best benefit the majority of people. This, in turn, implies that the rational transfer of technology requires governments in developing countries to establish dental health policies.

The second major issue relates to the technologies selected by the public health community for transfer. These technologies should receive the same rigorous evaluation of the effectiveness and appropriateness before they are transferred.

You can rate the basic technologies for preventing or treating the two major dental diseases by the prevalence of the disease or condition in developing countries; the cost of the technology, either directly or indirectly, in

terms of manpower, equipment and facilities, or indirectly in terms of the necessary infrastructure development such as transportation and central water supply systems; and the effectiveness of the technology in improving oral health based on estimates from their use in developed countries.

What may be a cost-effective preventive measure in a developed country, say for preventing dental caries, may not be so in a developing country, depending on the country's stage of development. Caries may not be a primary oral health problem. In contrast, periodontal disease is more prevalent and serious questions can be raised about the effectiveness of existing technology in preventing this condition. Thus it is not clear that the available preventive technologies from developed countries, that can be transferred and are affordable, address the primary oral health problem of developing countries - namely periodontal disease.

Although a technology may reduce the loss of teeth, the cost of the technology should be weighed against the importance the population places on saving teeth versus the benefits gained from alternative expenditures of the same monies. It is sometimes difficult for people like us, the dental health providers and administrators, to accept that the transfer of relatively inexpensive technologies of established effectiveness still may not have high priority in some countries. We have to weigh what else can be done with the same money in other key areas.

I have a few comments about the meeting. I was both impressed and a little concerned about the consensus of agreement about so many of the issues addressed in this meeting. There seems to be a unity of purpose and an understanding of common goals. This is unusual in an area where there could be so much ambiguity. It was probably that way because we were not very specific about what we talked about. I am not convinced we do know what our objectives are. If we treated them in terms of resources, in terms of personal freedom, and in terms of treatment, there are many choices to be made, and soon our group is going to have to make those choices. This group must be a force for change in developing countries.

A second major theme in this conference which I fully supported was that

dental disease, like any other major affliction of mankind, has to be seen in a broad economic and social context. If that is true, I am a little concerned that we have mostly dentists with us. To some extent I see us as a group who go to church, whatever religious persuasion we are from and we talk about sin - but unfortunately we are not the sinners! The sinners do not go to church.

The extent of the dental problem is so vast and the available help so small there is little hope for developing an effective system on the basis of a traditional cure for the majority of people. The focus of our efforts should be our provision of emergency care to relieve pain and suffering, and secondly, prevention, especially as it relates to the increasing and potentially explosive caries problems in developing nations.

If we are going to establish curative programmes, we should start thinking about the operative auxiliaries at a lower cost level than that of training dentists. The development of dental schools per se should probably have no priority until countries are much further advanced.

Centralization of problem-solving is relevant. Transfer of technology should go in both directions.

The establishment of effective preventive and curative programmes requires integration of dental health systems. The Minister of Health down to community workers will have to be involved in the community dental health care.

Dental facilities have such low priority in developing countries that you will be fighting a constantly losing battle to gain the necessary resources.

It is probably a national decision to give low priority to dental problems because of the multitude of other problems facing developing countries.

The isolation of dentistry from the mainstream of medical activities is the probable legacy of having a separate profession. We are not going to deal with this position until the people who are in the mainstream of health activities - the physicians, the nurses, the community health workers - see

themselves as having as much responsibility for dentistry as any other health service.

If you are a devoted professional doing a special job in your own area, you will always feel you are not getting enough resources. You are always going to be in that struggle - I hope you will be effective in it.

Good planning and administration are keys to effective dental health progress and this means access to base-line data and it needs continual up-dating of that data. I have not seen any data on costs for operating these programmes. We will have to put these costs down on the table to see what we are getting for our money.

What options are there for the future? Winston Churchill said during the Battle of Britain "I have nothing to offer you but blood, sweat and tears". That is probably true. We are a small group and it is going to be hard work to effect a change in this particular area. If we have no illusions about that, I think we are probably in fairly good shape!

The first positive thing is that WHO has increasing awareness of dental health, and organizations like AHRTAG are getting involved, and people from the Netherlands have formed an organization.

For the first time the IADR is getting into international affairs. We have established an active committee that is going to try to set up a programme for exchange with developing countries as it relates to epidemiological research and other research - health service research, biological research. WHO is already having an impact in setting up research and demonstration centres where they can train people to do the evaluation. We also need research on the transfer of technology and equipment.

We have measured the impact of dental disease in appropriate dental measures. If you ask people about their general satisfaction with their dental health, those without teeth are more satisfied than those with teeth. It shows we are measuring things the wrong way. We should measure the psycho-social impact

that this disease process is having on our nations, whether it is loss of days of work, loss of money, pain and suffering, loss of sleep - there are many things which should be dealt with. It is important to build our case that the disease for which we are asking for resources to treat and prevent requires higher priority than it is receiving.

I am also encouraged in terms of AHRTAG developing training materials, and programmes for the training of auxiliaries and dental students etc. Can it not function in a more co-ordinating role to ask other institutions throughout the country to take responsibility for developing something in a specific area? There are a lot of schools with experience in training auxiliaries; they might not come up with something which is totally appropriate for a developing country, but there are a lot of resources out there and you have to marshal the resources instead of trying to do it yourself.

I think the FDI has a lot of potential too. If the majority of practising dentists were aware of these issues and understood them, they would give you a lot more help than they do now. A lot could be done through the FDI, both in educating the dentists and national governments in educational co-ordination and research co-ordination. I am enthusiastic there as well.

Another thing I would like to see is for Dr Hobdell and Dr Sheiham to do an in-depth article. I have never seen a really thoughtful and careful analysis of what is going on with regard to dental health in developing countries which would persuade the government planners and the people in dental academia to take an interest.

CONCLUSIONS

Dr J.E. Ahlberg

It is not possible to summarize our conclusions in five minutes. However, I will try to indicate ways in which organizations represented here can help in certain key areas such as auxiliary training, development of equipment and health education.

- I will explore ways in which the FDI could assist generally in the promotion of dental education and dental public health in developing countries.
- Dr Sheiham has stressed the importance of beginning other regional training centres - apart from those in Africa and Thailand. WHO has a key role to play here in developing new centres.
- IADR should continue its investigations into socio-dental indicators in relation to pain and dysfunction.
- Dr Barmes has highlighted the role that AHRTAG can play in looking into equipment, health education materials and training programmes for health auxiliaries.

The importance of training and communication has been well illustrated by Dr Smith and Ms Kenyon who drew our attention to the special dental health problems of refugees in developing countries and the importance of providing both preventive and emergency care.

Finally, Dr Bernal and Dr Luhanga have proposed that future meetings be held in Mozambique and Tanzania to review developments in these key areas of auxiliary training programmes, socio-dental indicators of pain and dysfunction, equipment and health education. I hope it will be possible for these meetings to take place in 1983 and that by then concrete projects will have arisen as a result of this most enjoyable symposium.

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- Dental health newsletter – bi-annual newsletter promoting dental health care
- Aids for living – newsletter on aids for the disabled

For details of prices and postage write to AHRTAG, 85 Marylebone High Street, London W1M 3DE, United Kingdom.

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